FURUNO

Installation Manual
MARINE RADAR MODEL1824C/1834C/ 1934C/1944C/1954C/1964C
COLOR VIDEO PLOTTER GD-1920C

NAVnet VX2

FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

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FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, 662-8580, JAPAN

Telephone : +81-(0)798-65-2111
Fax : +81-(0)798-65-4200

・FURUNO Authorized Distributor/Dealer

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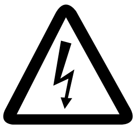
Pub. No. IME-35430-K

(HIMA) MODEL1804C_GD-1920C

＊00015180319＊

⚠ SAFETY INSTRUCTIONS

⚠ WARNING



Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

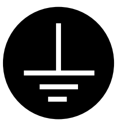
Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Turn off the power at the mains switchboard before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ CAUTION



Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass.

	Standard	Steering
Display unit	0.70 m	0.45 m
MODEL1824C antenna unit	1.25 m	0.85 m
MODEL1834C antenna unit	0.90 m	0.70 m
MODEL1934C antenna unit	1.00 m	0.80 m
MODEL1944C antenna unit	1.00 m	0.80 m
MODEL1954C antenna unit	1.00 m	0.75 m
MODEL 1964C antenna unit	1.65 m	1.25 m
Power supply unit PSU-005*[1]	1.40 m	0.95 m
Power supply unit PSU-008*[2]	0.80 m	0.50 m

*[1] For MODEL 1954C *[2] For MODEL1964C

⚠ WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

Distances at which RF radiation levels of 100 and 10 W/m^2 exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible - Ask your FURUNO representative or dealer to provide this feature.

MODEL		Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
MODEL 1824C		Nil	Worst case 0.70 m
MODEL 1834C		Nil	Worst case 1.50 m
MODEL 1934C		Worst case 0.20 m	Worst case 1.70 m
MODEL 1944C		Nil	Worst case 1.20 m
MODEL 1954C	XN-12A	Worst case 0.10 m	Worst case 2.00 m
	XN-13A	Nil	Worst case 1.40 m
MODEL 1964C	XN-12A	Worst case 0.50 m	Worst case 5.40 m
	XN-13A	Worst case 0.40 m	Worst case 3.60 m

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Display unit	RDP-149	-	1	
Antenna unit	RSB-0094-075	-	1	MODEL 1824C
	RSB-0071-057	-		MODEL 1834C
	XN10A-RSB-0070-064	-		MODEL1934C, 24 rpm
	XN10A-RSB-0073-064	-		MODEL1934C, 48 rpm
	XN12A-RSB-0070-059	-		MODEL1944C, 24 rpm
	XN12A-RSB-0073-059	-		MODEL1944C, 48 rpm
	XN12A-RSB-0072-060	-		MODEL1954C, 4 ft, 24 rpm
	XN12A-RSB-0073-060	-		MODEL1954C, 4 ft, 48 rpm
	XN13A-RSB-0072-060	-		MODEL1954C, 6 ft, 24 rpm
	XN12A-RSB-0072-061	-	1	MODEL1964C, 4 ft, 24 rpm
	XN12A-RSB-0073-061	-		MODEL1964C, 4 ft, 48 rpm
	XN13A-RSB-0072-061	-		MODEL1964C, 6 ft, 24 rpm
Power supply unit	PSU-005	-	1	For MODEL1954C
Power supply unit	PSU-008	-	1	For MODEL1964C
Installation materials	CP03-25401	008-443-160	1set	For ant. unit of Model 1824C
	CP03-16901	008-478-750	1set	For ant. unit of Model 1834C
	CP03-18401	008-503-360	1set	For ant. unit of Model 1933C/1944C/1954C/1964C
	CP03-22700	000-080-049	1set	For display unit, MJ-A3SPF0018-050Z cable, CP03-22701
	CP03-21800	000-080-014	1	For MODEL1824C/1834C 10 m cable MJ-B24LPF-0002-100
	CP03-21810	000-080-015		For MODEL1824C/1834C 15m cable MJ-B24LPF-0002-150
	CP03-21820	000-080-016		For MODEL1824C/1834C 20m cable MJ-B24LPF-0002-200
	CP03-21830	000-080-017		For MODEL1834C/1834C 30m cable MJ-B24LPF-0002-300
	CP03-22000	000-080-021	1	For 1934C/1944C/1954C 10m cable MJ-B24LPF-0005-100
	CP03-22010	000-080-022		For 1934C/1944C/1954C 15m cable MJ-B24LPF-0005-150
	CP03-22020	000-080-023		For 1934C/1944C/1954C 20m cable MJ-B24LPF-0005-200
	CP03-22030	000-080-024		For 1934C/1944C/1954C 30m cable MJ-B24LPF-0005-300
	CP03-30500	000-083-620	1	For 1964C, 10m RW-9771 cable
	CP03-30510	000-083-621		For 1964C, 15m RW-9771 cable
	CP03-30520	000-083-622		For 1964C, 20m RW-9771 cable
	CP03-30530	000-083-623		For 1964C, 30m RW-9771 cable

(Con't from next page)

Name	Type	Code No.	Qty	Remarks
Installation materials	CP03-24500	000-080-191	1	For power supply unit of 1954C cable VL3P-VV-S2X2C-AA050 cable MJ-B24LPF0009-050 Inst. Mat. CP03-24501
	CP03-30600	000-084-769	1	For power supply unit of 1964C cable VL3P-VV-S2X2C-AA050 cable MJ-B24LPF0011-050 Inst. Mat. CP03-30601
Spare parts	SP03-14501	000-844-420	1set	Fuses for power supply unit PSU-008 (Model 1964C)
	SP03-14001	000-080-018	1set	Fuses for power supply unit PSU-005 (Model 1954C)
	SP03-14001	000-080-018	1set	Fuses for display unit

Optional supply

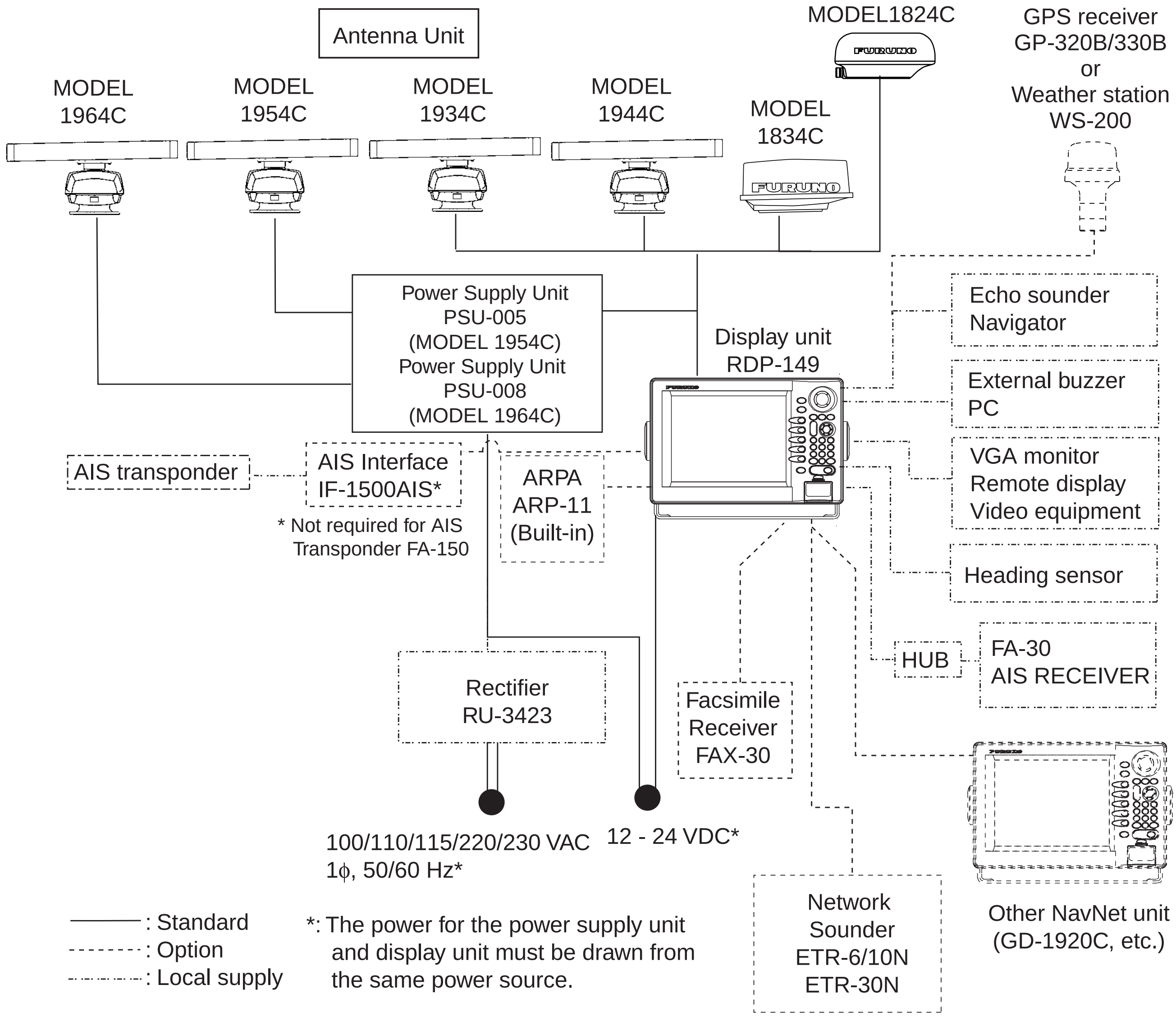
Name	Type	Code No.	Qty	Remarks	
Rectifier	PR-62	000-013-484	1	For GD-1920C, 100 VAC	
		000-013-485		For GD-1920C, 110 VAC	
		000-013-486		For GD-1920C, 220 VAC	
		000-013-487		For GD-1920C, 230 VAC	
	RU-3423	000-030-443	1	For MODEL series	
	RU-1746B-2	000-030-439	1	For Model 1964C	
External buzzer	OP03-136	000-086-443	1		
Cable assy.	MJ-A6SPF0014-010C	000-154-027-10	1	For NavNet, 1 m	
	MJ-A6SPF0014-050C	000-154-049-10	1	For NavNet, 5 m	
	MJ-A6SPF0014-100C	000-154-050-10	1	For NavNet, 10 m	
	MJ-A6SPF0014-200C	000-154-051-10	1	For NavNet, 20 m	
	MJ-A6SPF0014-300C	000-154-052-10	1	For NavNet, 30 m	
	MJ-A6SPF0012-050C	000-154-053-10	1	For navaid, 5 m, 6P-6P cross	
	MJ-A6SPF0012-100C	000-154-037-10	1	For navaid, 10 m, 6P-6P cross	
	MJ-A6SPF0003-050C	000-154-054-10	1	w/6P connector, 5 m	
	MJ-A6SPF0009-100C	000-154-036-10	1	w/6P connector, 10 m	
	MJ-A6SPF0007-100	000-125-237	1	For compass, 10 m	
	MJ-A7SPF0007-050	000-144-418	1	For external buzzer, PC, w/7P connector, 5 m	
	MJ-A6SRMD/TM11AP8-005	000-144-463	1	Adapter cable for HUB	
	MJ-B24LPF0008-100	000-145-125	1	For remote display, 10 m	With CP03-24801 (EMI core)
	MJ-B24LPF0008-200	000-145-126	1	For remote display, 20 m	
	MJ-B24LPF0008-300	000-145-127	1	For remote display, 30 m	
RGB output cable kit	OP03-176	008-526-360	1	For external monitor	
ARP kit	ARP-11	008-523-050	1	ARP Board, for radar	
PIP kit	OP03-175	008-523-070	1	Connection video source	
Chart card	-	-	-	Specify when ordering.	
Mounting bracket (1)	OP03-92 OP03-208	008-445-070 001-078-340	1	For MODEL1834C	
Mounting bracket (2)	OP03-93 OP03-209	008-445-080 001-078-350	1	For MODEL1824C	
AIS Interface	IF-1500AIS			Connection of AIS FA-100	

SYSTEM CONFIGURATIONS

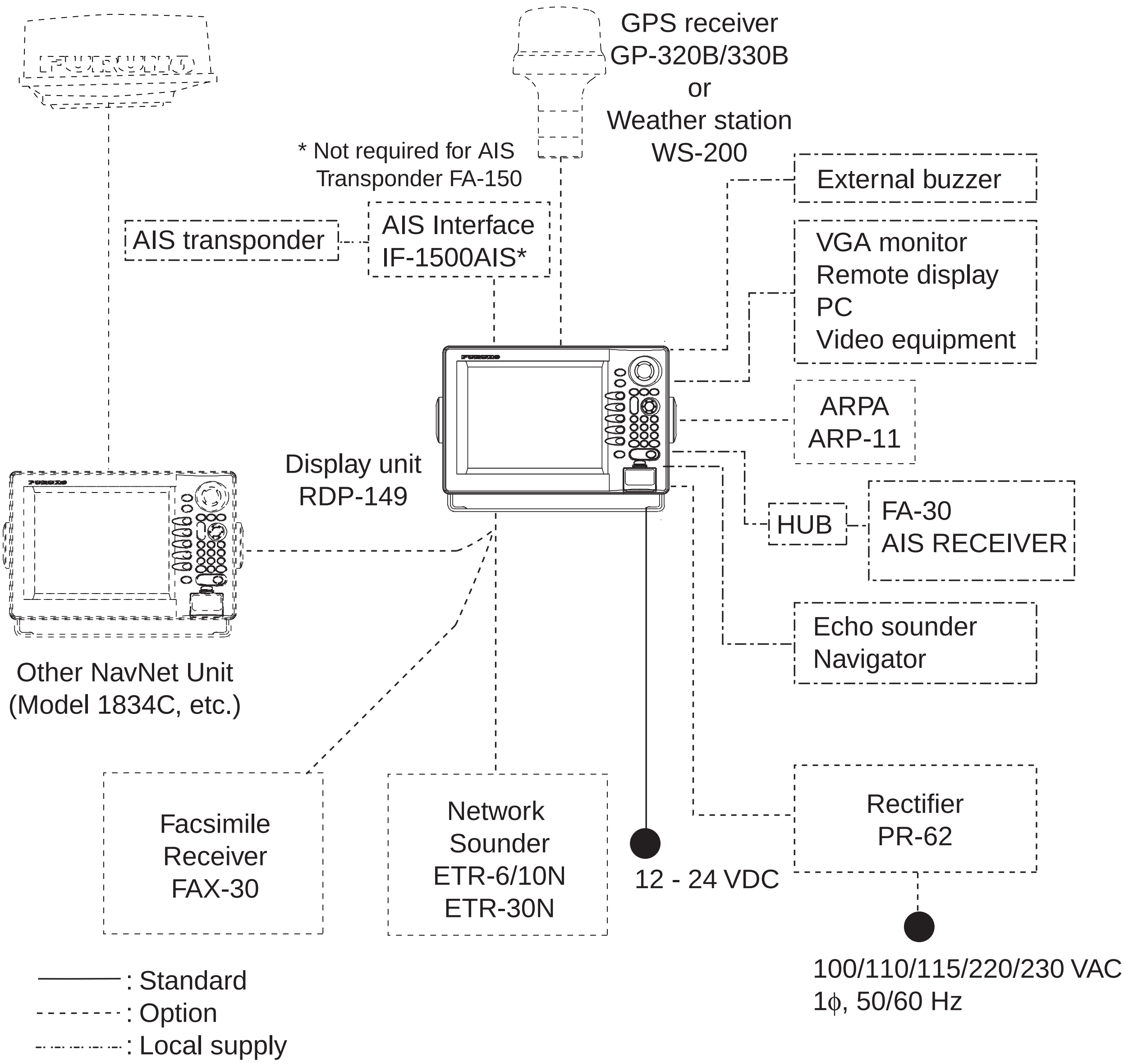
All NavNet products incorporate a “network circuit board” to integrate each NavNet product on board through an optional LAN cable (Ethernet 10BASE-T). Each NavNet product is assigned an IP address to enable transfer of images between other NavNet products. For example, video plotter pictures can be transferred to a radar and vice versa. Pictures received via the NavNet may be adjusted at the receiving end.

The number of display units which may be installed depends on the number of network sounders connected. For a system incorporating three or more NavNet products, a “hub” is required to process data.

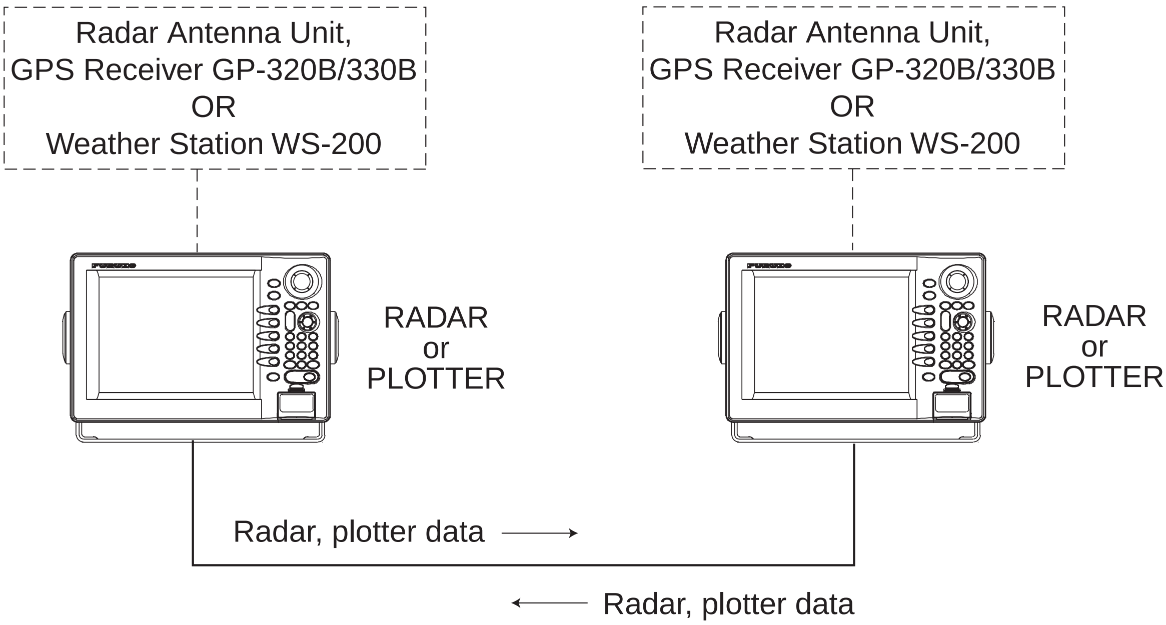
For one network sounder: one radar and three plotters, or four plotters
For two network sounders: one radar and two plotters, or four plotters



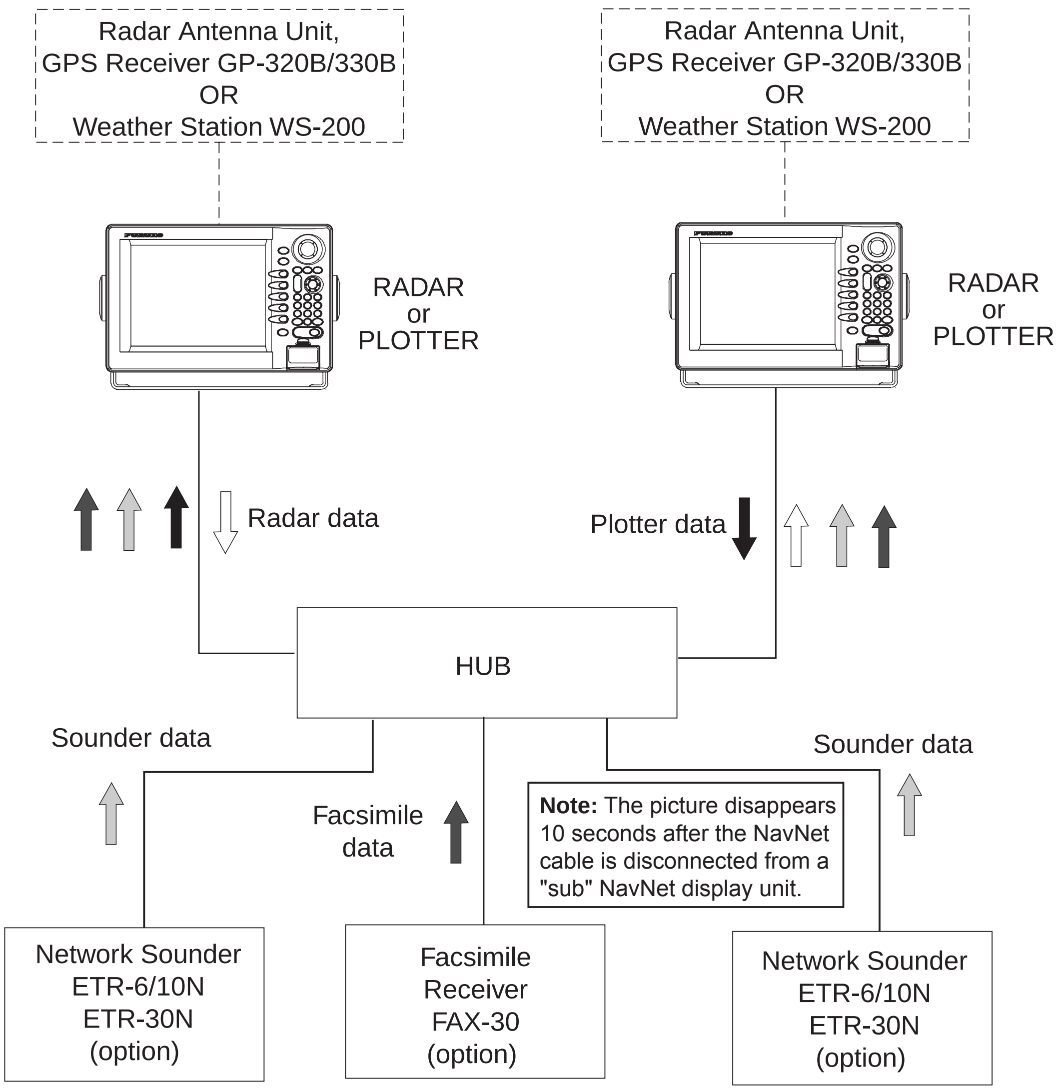
NavNet system: MODEL1824C/1834C/1934C/1944C/1954C/1964C



NavNet system: GD-1920C



Two-unit NavNet system



Three-or-more unit NavNet system

1. MOUNTING

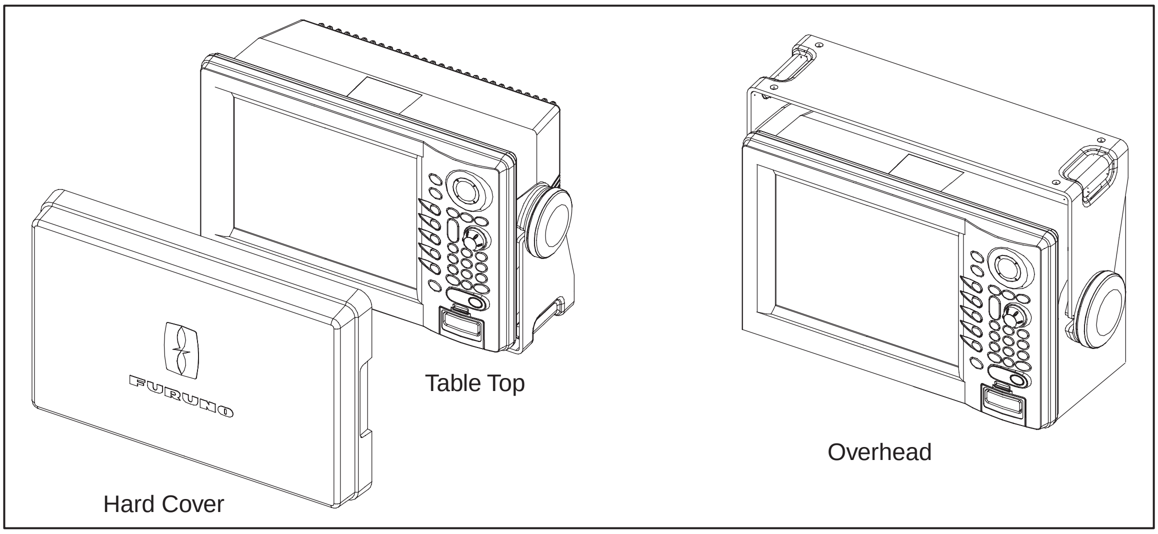
NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

1.1 Mounting the Display Unit

The display unit can be mounted on a tabletop, on the overhead or flush mounted in a console or panel.



Tabletop, overhead mounting method

1.1.1 Mounting considerations

When selecting a mounting location for the display unit, keep the following in mind:

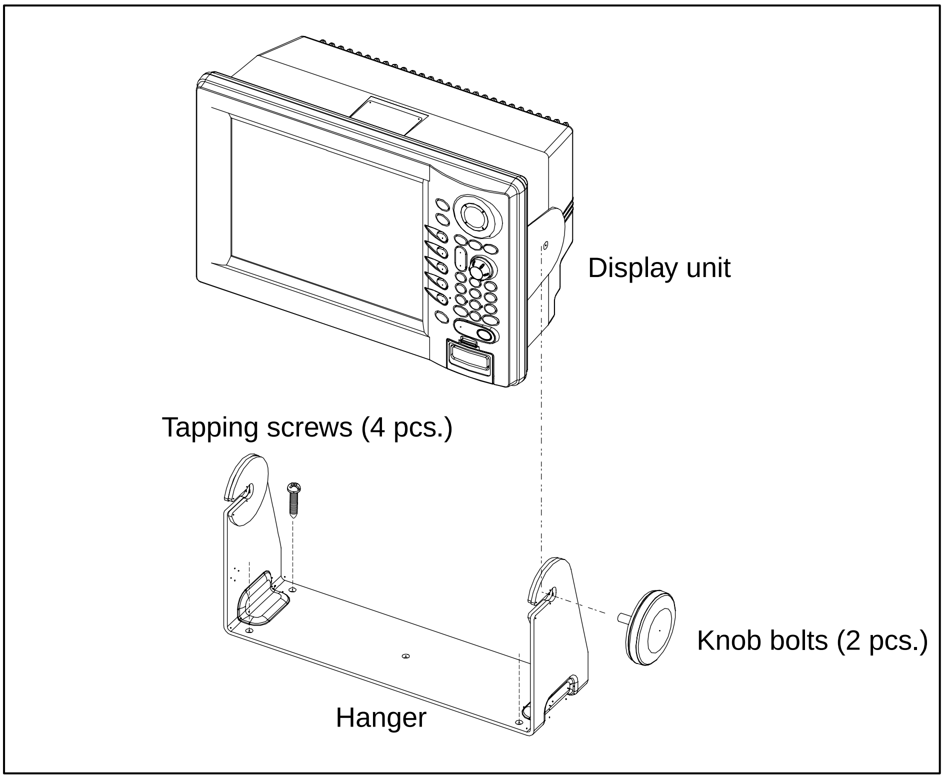
- Keep the display unit out of direct sunlight.
- The temperature and humidity at the mounting location should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away from electromagnetic field generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables. Minimum recommended space is shown in the outline drawing for the display unit.
- A magnetic compass will be affected if the display unit is placed too close to it. Observe the compass safe distances shown in the SAFETY INSTRUCTIONS to prevent disturbance to the magnetic compass.

1.1.2 Mounting procedure

Tabletop, overhead mounting

Follow the procedure below to mount the display unit on a tabletop or the overhead.

1. Fix the hanger by using four tapping screws (5x20).
2. Screw knob bolts in display unit, set it to the hanger, and tighten the knob bolts.
3. Attach the hard cover to protect the LCD.

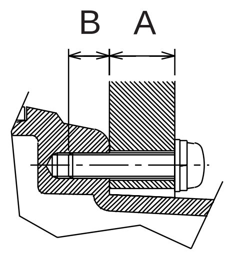


Tabletop, overhead mounting of display unit

Note: For the overhead mounting, reinforce the mounting location and secure the hanger, with bolts, nuts and washers (local supply).

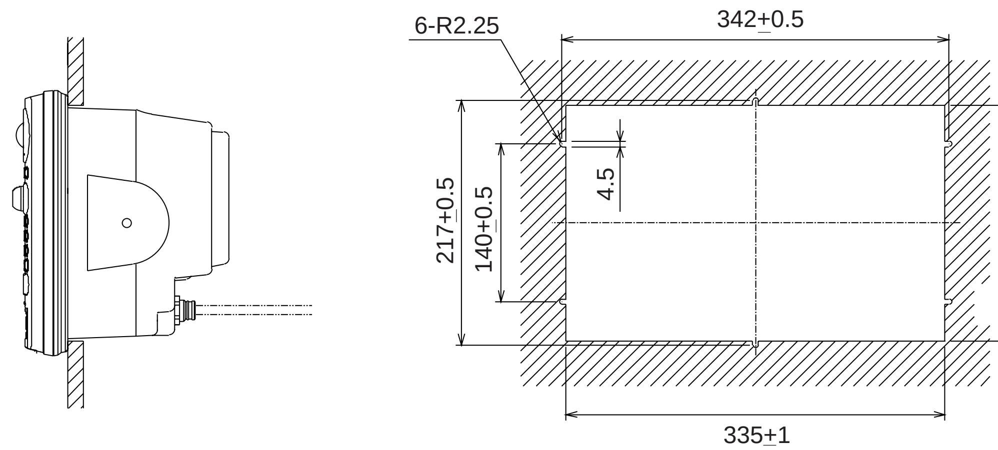
Flush mounting

Note: Use supplied pan head screws when the thickness of the bulkhead is from 11 to 14 mm. For bulkhead which exceeds 14 mm in thickness, the length of the pan head screws should be bulkhead thickness (A) plus 7.8±1.2 mm. Also the length of B should be max. 8 mm.



Fixing screw, side view

1. Prepare a cutout in the mounting location whose dimensions are as shown below.
2. Attach the flush mount sponge to the display unit.
3. Fix the display unit by using six washer head screws M4x20. Refer to the outline drawing at the back of this manual.



Flush mounting of display unit

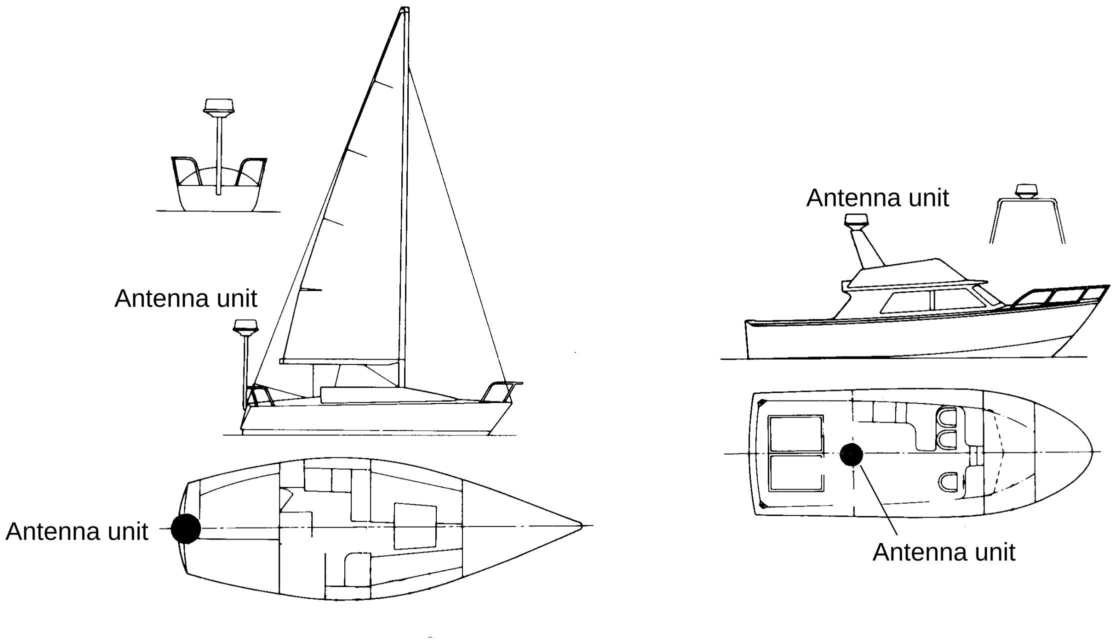
Note: When installing the display unit in a panel, attach the vinyl tube (ø6, local supply) to the drain hole to allow moisture to escape. Then, fasten the tube to the drain hole with a cable tie.

1.2 Mounting the Antenna Unit of MODEL1824C

1.2.1 Mounting considerations

When selecting a mounting location for the antenna unit, keep in mind the following points.

- Install the antenna unit on the hardtop, radar arch or on a mast on an appropriate platform. (For sailboats, a mounting bracket is optionally available.) It should be placed where there is a good all-round view with, as far as possible, no part of the ship's superstructure or rigging intercepting the scanning beam. Any obstruction will cause shadow and blind sectors. A mast, for instance, with a diameter considerably less than the width of the antenna unit, will cause only a small blind sector. However, a horizontal spreader or crosstrees in the same horizontal plane would be a much more serious obstruction; place the antenna unit well above or below it.

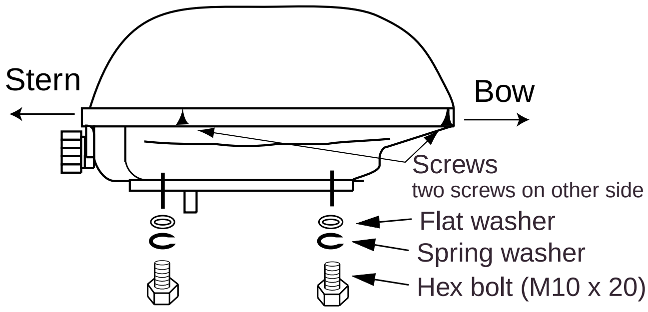


Typical antenna unit placement on sailboat and powerboat

- In order to minimize the chance of picking up electrical interference, avoid where possible routing the antenna cable near other electrical equipment onboard. Also avoid running the cable in parallel with power cables.
- Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.

1.2.2 Mounting procedure

1. Remove the mounting hardware from the bottom of the antenna unit: four each of hex bolts (M10X20), spring washers and flat washers. Save the mounting hardware to use it to fix the antenna unit to the mounting platform later on.



Antenna unit, showing location of mounting hardware

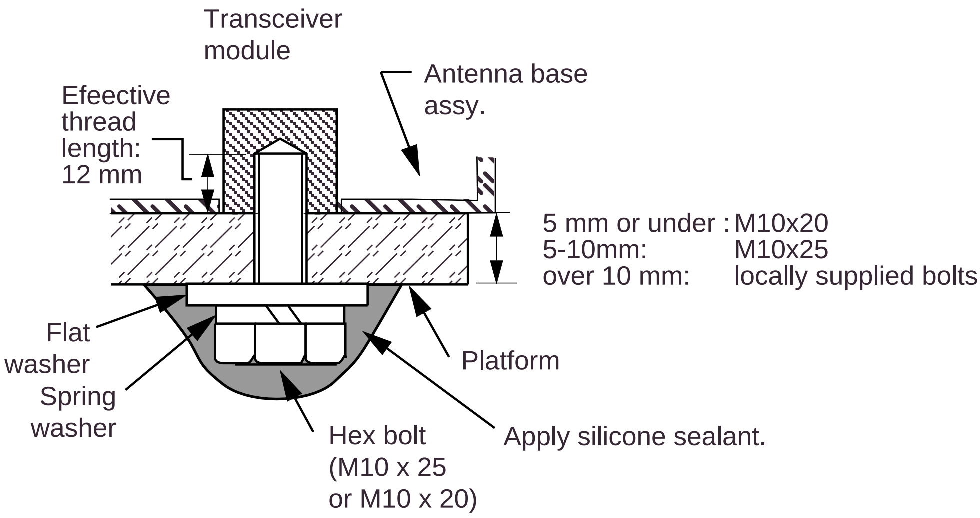
2. Construct a platform (wood, steel*, or aluminum) of 5-10 mm (recommended dimension) in thickness referring to the outline drawing at back of this manual. Fasten the platform to the mounting location. Next, position the mounting base on the platform so the cable entrance faces the stern direction.

   *: For steel platform take appropriate measures to prevent corrosion.

   Note: When drilling holes in the platform, be sure they are parallel with the fore and aft line.

3. Using the hex bolts, flat washers and spring washers removed at step 1, fasten the mounting base to the platform. **The torque should be between 19.6-24.5 N•m.**

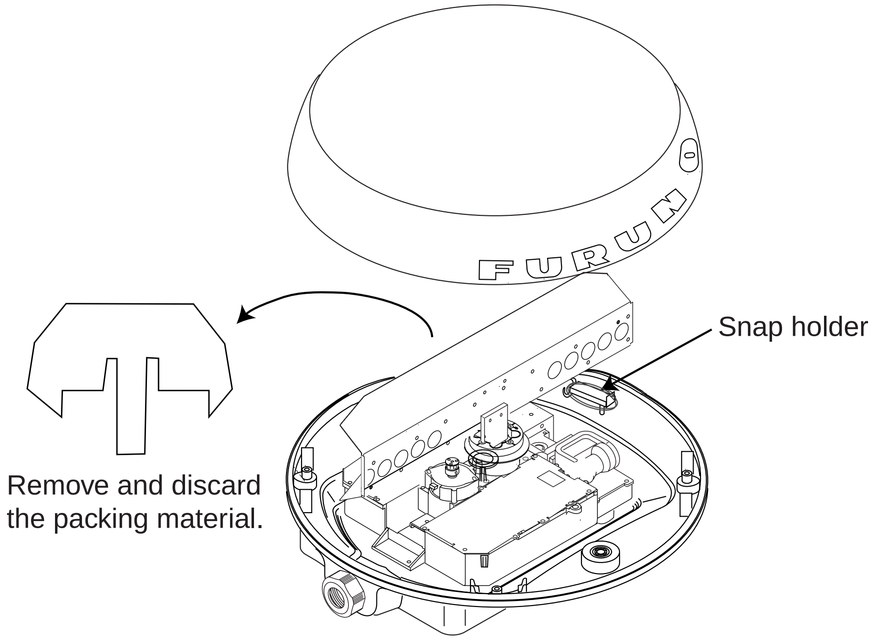
   Note: Longer hex bolts (M10X25) are supplied with the installation materials. Use them instead of the hex bolts removed earlier if the mounting platform thickness is 5–10 mm.



How to fasten the mounting base to platform

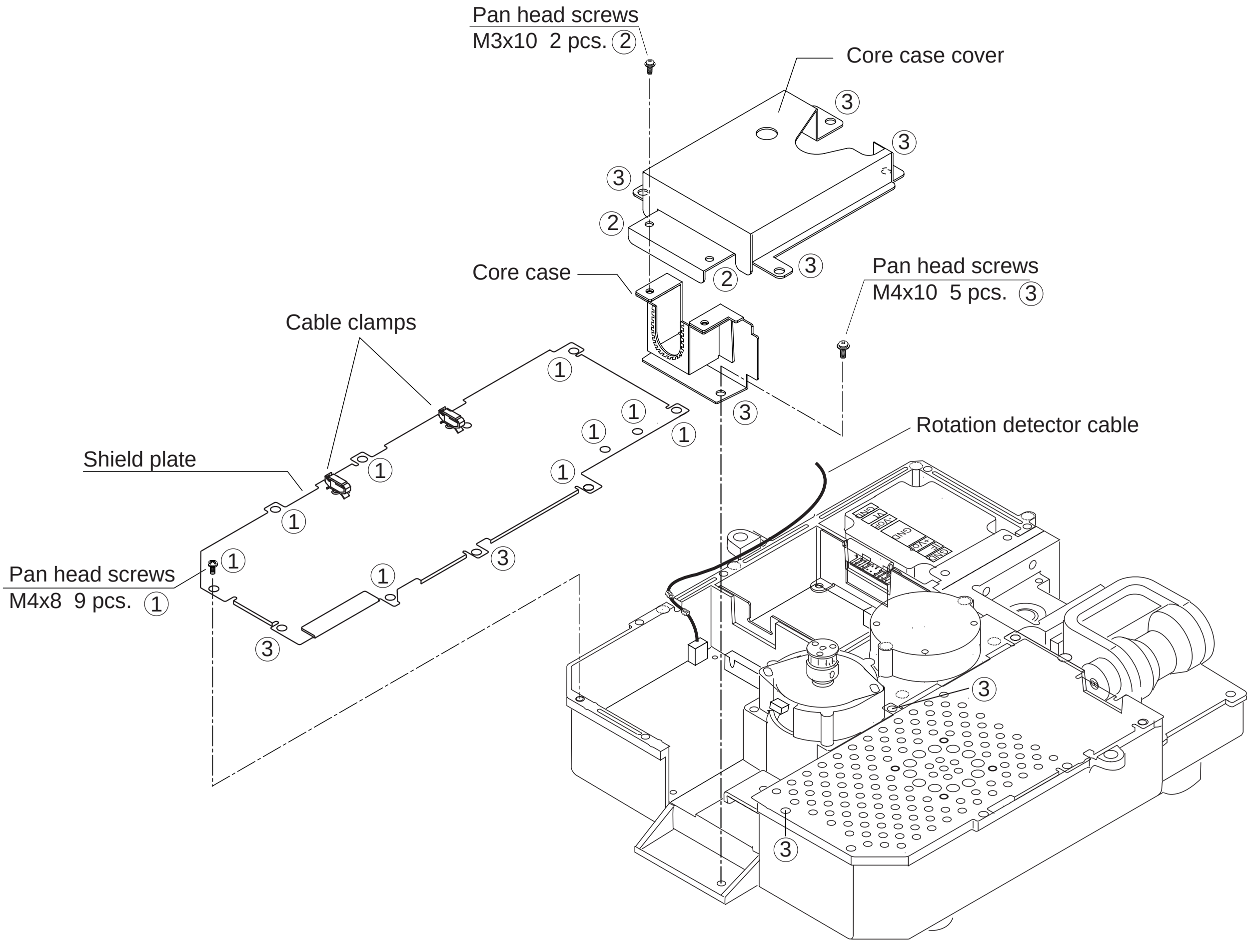
4. The mounting base is fitted with a snap holder, which may be used to hang the cover after removal. Use the hole next to a screw hole inside the cover to hang it.
   a) Unfasten the snap assy. with the string attached at the holder in the mounting base.
   b) Unwind the string.
   c) Attach the snap to a screw hole on the inside of the cover.

Note: Do not hang any other objects with the snap.



Antenna unit, inside view

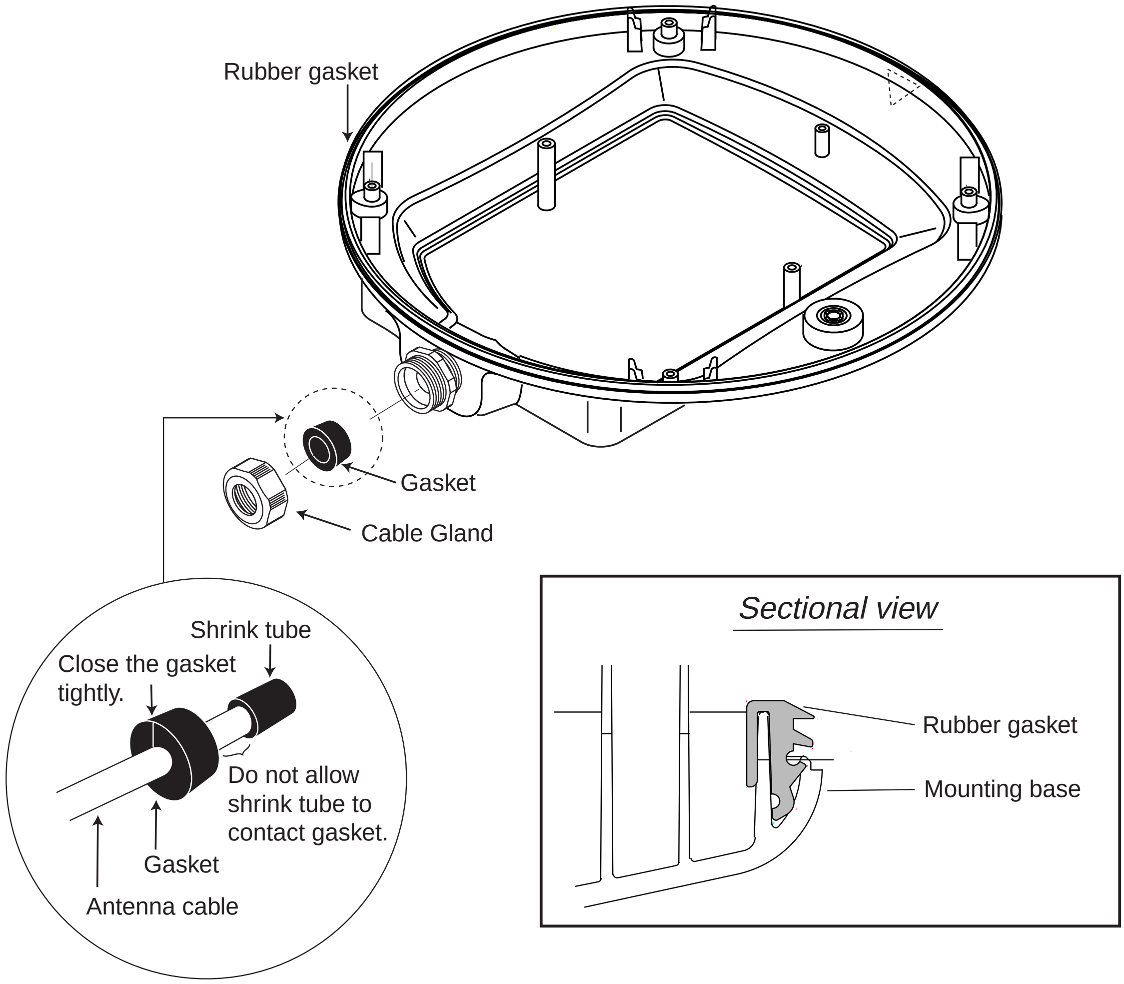
5. Unfasten the rotation detector cable from the cable clamps, referring to the figure on page 1-10.
6. Unfasten 16 screws (①, ② and ③ in the figure below) to dismount the shield plate, core case and core case cover.



Caution: Be careful not to pinch the rotation detector cable when remounting the shield plate.

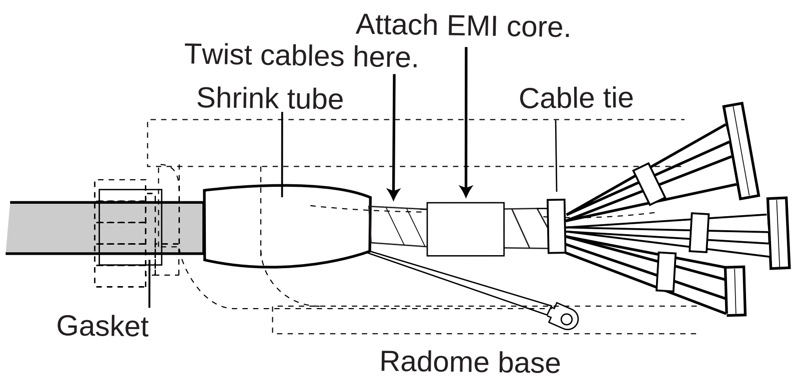
7. Pass the antenna cable with connector through the cable gland, gasket and cable entrance of the antenna unit, and then tighten cable gland.

   Note 1: Be sure the shrink tube on the antenna cable does not contact the gasket.
   Note 2: Pinch the gasket tightly and insert it into the cable entrance. Confirm that the slit in the gasket is completely closed after inserting it into the cable entrance.



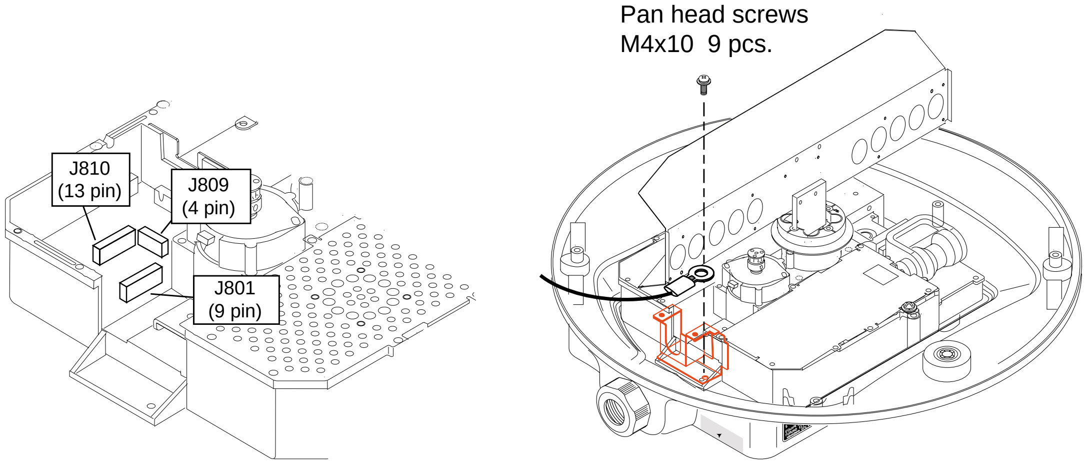
Antenna unit, inside view

8. Twist antenna connector cables at the position between the shrink tube and the cable tie, and then attach EMI core (supplied) to cables as shown below. After attachment, shift EMI core slightly to confirm that it does not pinch cables.



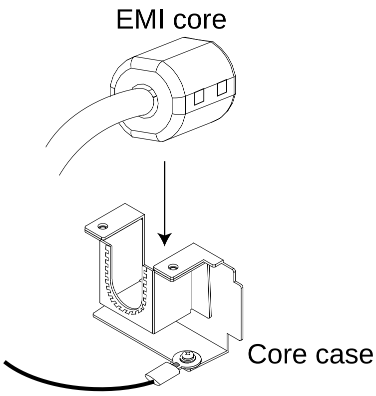
Location of EMI core

9. Attach connectors of the antenna cable to the locations shown in the figure below, and then fasten a pan head screw M4x10 to fix shield cable and core case (removed at step 6.)



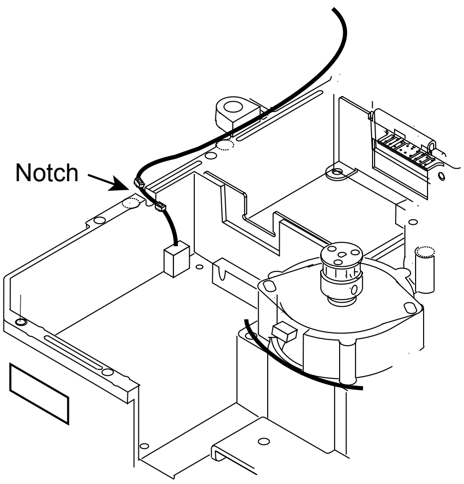
Antenna unit, connector location and fixing the shield cable w/core case

10. Put the EMI core on the antenna cable into the core case attached at step 9, with the flat side of the core facing downward.



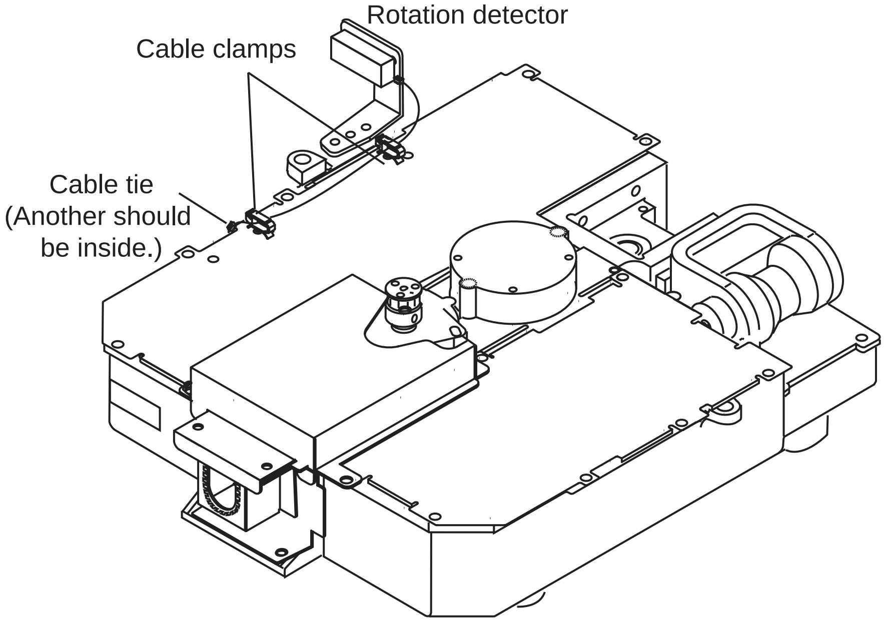
EMI core, putting into core case

11. Refasten the shield plate and core case cover with 15 screws. Be sure that the cable from the rotation detector passes through the notch between the two cable ties.



How to pass the rotation detector cable

12. Pass the cable from the rotation detector through two cable clamps.



Antenna unit, clamping the rotation detector cable

13. Follow the instructions on the label inside the mounting base to secure the snap assy.
14. Confirm that the rubber gasket is properly positioned and that the triangle mark on the radome cover is aligned with the triangle mark on the mounting base, then tighten the fixing screws for the cover. See the sectional view on page 1-8 for how to position the rubber gasket.

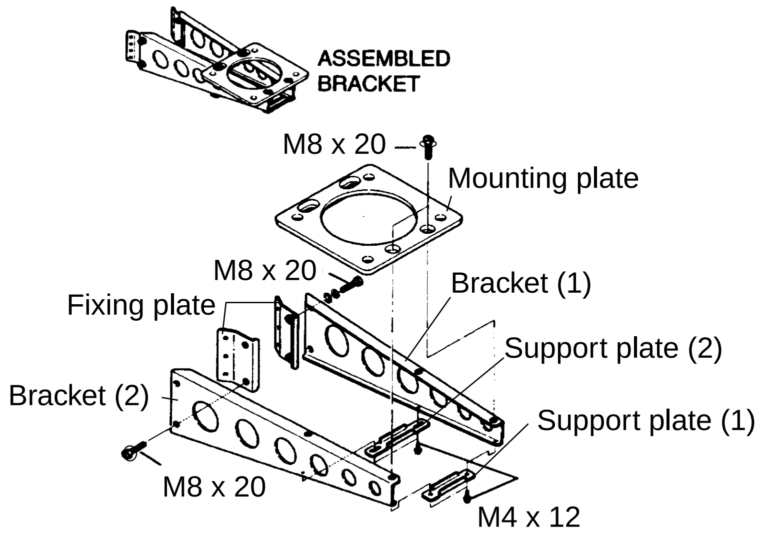
Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit to a mast on a sailboat is optionally available.

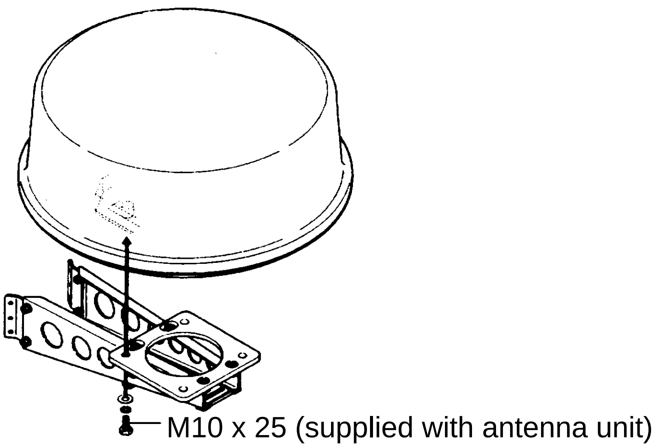
Contents of mounting bracket 2 kit Type: OP03-93, Code No.: 008-445-080

Part	Type	Code No.	Qty
Hex. bolt	M4x12	000-804-725	4
Hex. bolt	M8x20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-028-9101-0	100-206-810	1
Bracket (2)	03-028-9102-0	100-206-820	1
Fixing plate	03-028-9103-0	100-206-830	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket. For details, see the figure on the next page.



(A) Assembling the mounting bracket



(B) Fastening antenna to mounting bracket

How to assemble and mount the optional mounting bracket

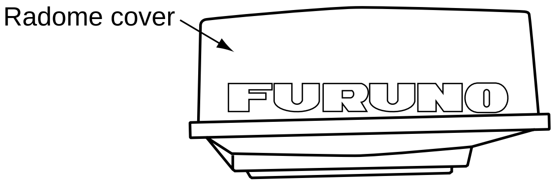
1.3 Mounting the Antenna Unit of MODEL1834C

1.3.1 Mounting considerations

- See the mounting considerations for the MODEL1824C on page 1-4.
- Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent deviation of the magnetic compass.

1.3.2 Mounting procedure

1. Open the antenna unit packing box carefully.
2. Unbolt the four bolts at the base of the radome cover to remove the cover.

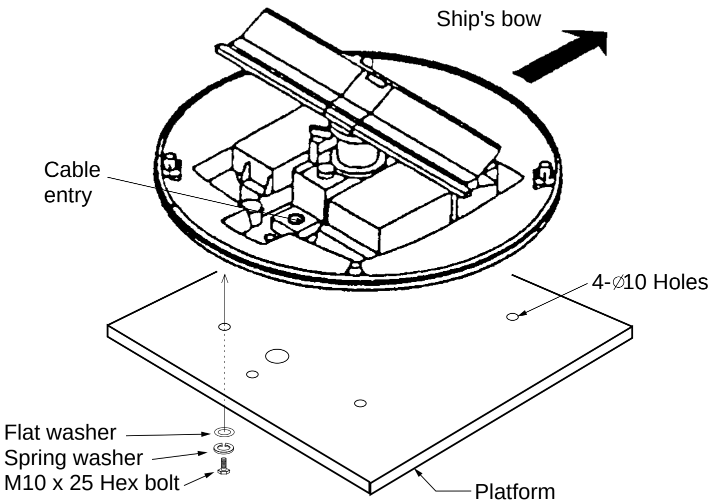


Antenna unit

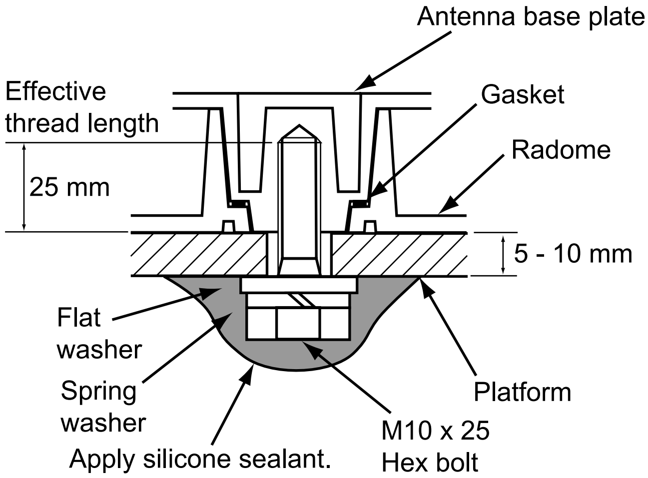
The mounting surface must be parallel with the waterline and provided with five holes (four fixing holes and one cable entry) whose dimensions are shown in the outline drawing at the back of this manual.

The unit is adjusted so a target echo returned from the bow direction will be shown on the zero degree (heading line) position on the screen. When drilling holes, be sure they are parallel with the fore and aft line.

3. Prepare a platform (wood, steel*, or aluminum) of 5 to 10 millimeters in thickness for the antenna unit.
   A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-16.) Find the cable entry on the radome base. Next, position the radome base so the cable entry faces the stern direction. This alignment must be as accurate as possible.
   *: For steel platform, take appropriate measures to prevent corrosion.



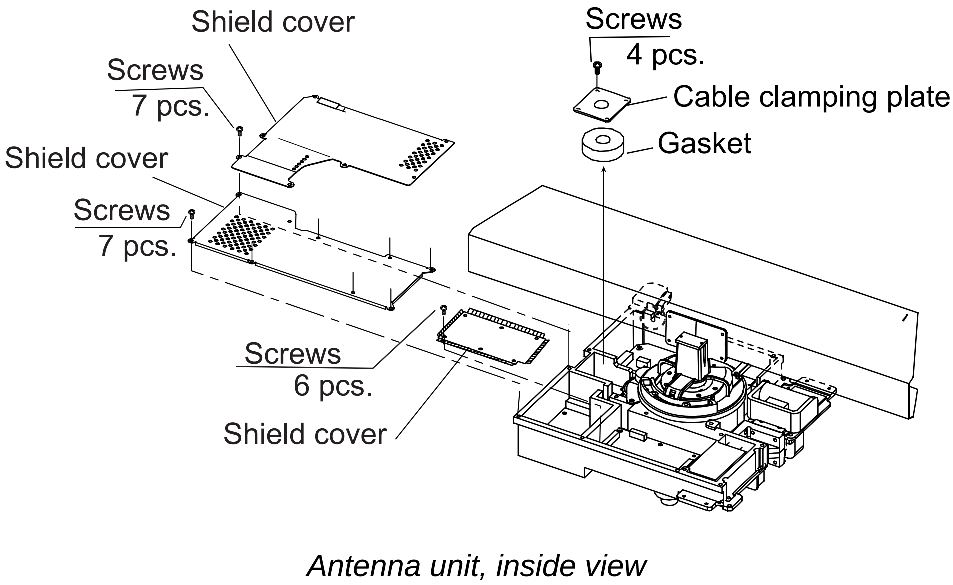
Antenna unit, cover removed



How to fasten the radome base to the mounting platform

Wiring and final preparations

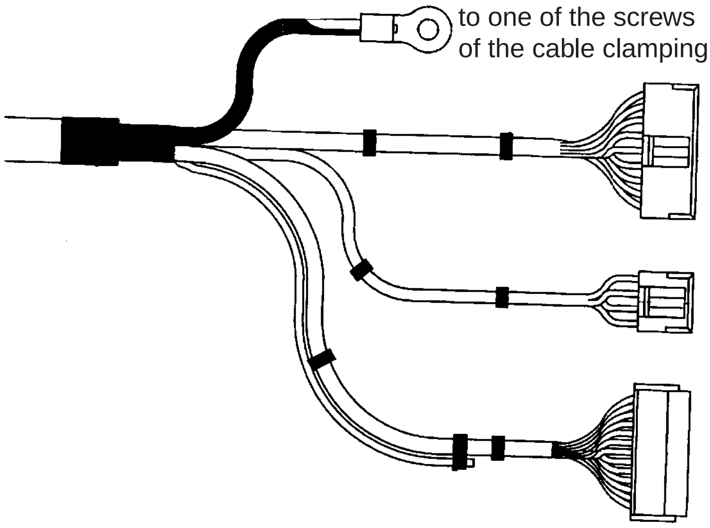
4. Drill a hole of approx. 16 mm diameter through the deck or bulkhead to run the signal cable between the antenna unit and the display unit. (To prevent electrical interference avoid running the signal cable near other electrical equipment and in parallel with power cables.) Pass the cable through the hole. Then, seal the hole with sealing compound for waterproofing.
5. Remove three shield covers in the radome.
6. Remove the cable clamping plate by unfastening four screws and removing a gasket.



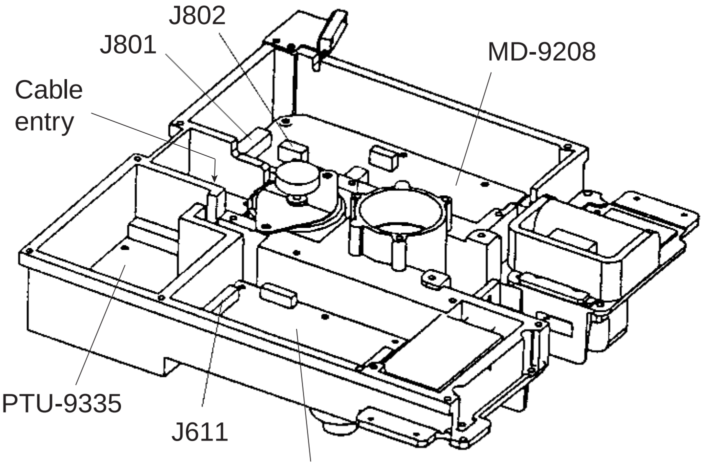
Antenna unit, inside view

7. Pass the cable through the hole at the bottom of the radome base.
8. Secure the cable with the cable clamping plate and gasket. Ground the shield wire by one of the screws of the cable clamping plate.

9. Attach three connectors of the signal cable to respective receptacles as shown below.

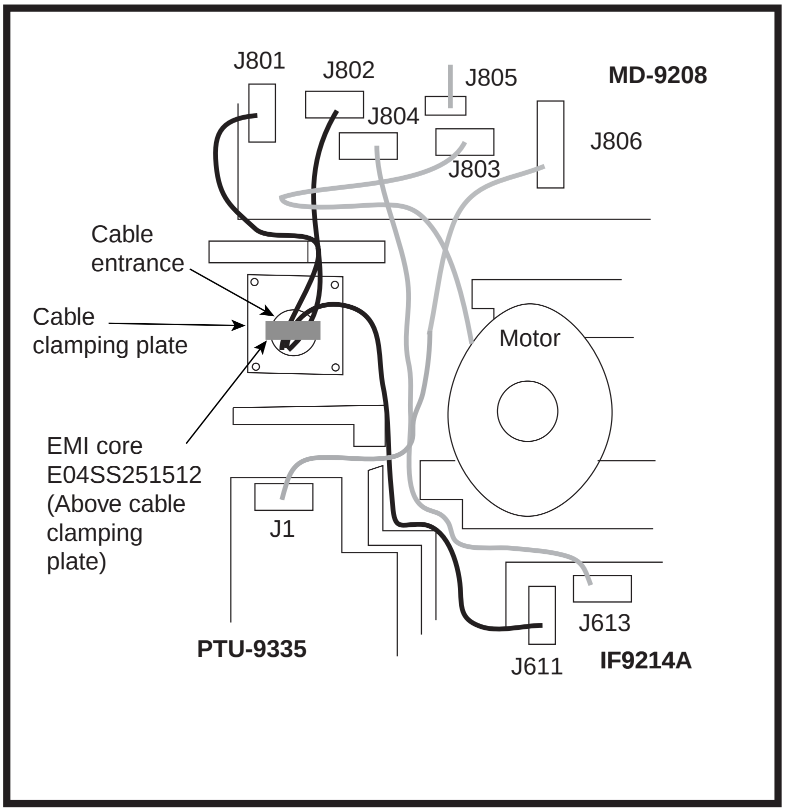


Signal cable, antenna unit side



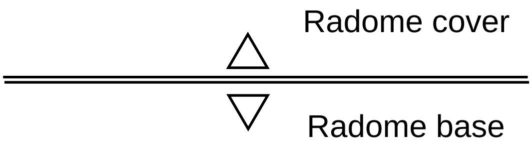
RF unit

10. Bundle the cables with the EMI core (supplied) as shown below.



EMI core

11. Fix the shield cover. Do not pinch the cable.
12. Attach the radome cover, aligning triangle mark on radome cover with that on radome base.



How to position the radome cover

13. Loosely fasten the radome fixing bolts. You will tighten them after confirming magnetron heater voltage.

Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit for the MODEL1834C to a mast on a sailboat is optionally available.

Contents of mounting bracket 1 (Type: OP03-92, Code No.: 008-445-070)

Part	Type	Code No.	Qty
Hex. bolt	M4X12	000-804-725	4
Hex. bolt	M8X20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-018-9002-1	100-206-751	1
Bracket (2)	03-018-9003-1	100-206-761	1
Fixing plate	03-018-9004-1	100-206-771	2

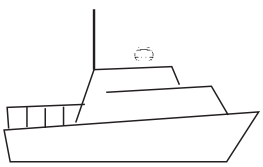
Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket. For details, see the figure on page 1-11.

1.4 Mounting the Antenna Unit of MODEL1934C/1944C/1954C/1964C

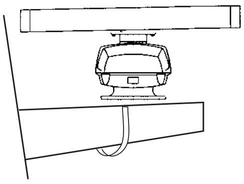
1.4.1 Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the antenna unit where there is a good all-round view. Any obstruction will cause shadow and blind sectors. A mast for instance, with a diameter considerably less than the horizontal beamwidth of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the antenna unit would be a much more serious obstruction; you would need to place the antenna unit well above or below it.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also avoid running the cable in parallel with power cables.
- A magnetic compass will be affected if the antenna unit is placed too close to it. Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- When this radar is to be installed on larger vessels, consider the following points:
  - The signal cable run between the antenna and the display units comes in lengths of 10 m, 15 m, 20 m and 30 m.
  - Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.

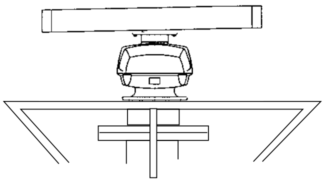
As shown in the figure below, the antenna unit may be installed on the bridge, on a common mast or on the radar mast.



(a) On bridge



(b) Common mast



(c) Radar mast

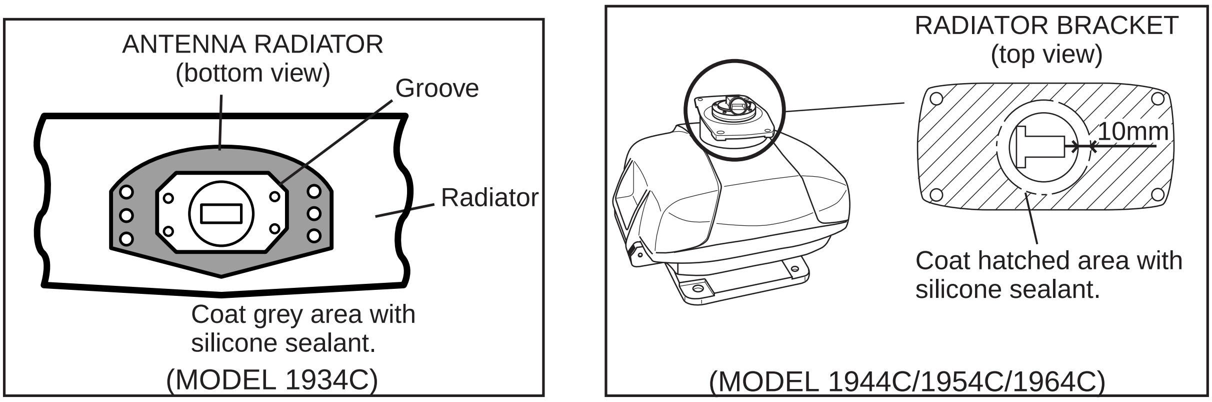
1.4.2 Mounting procedure

Referring to the outline drawing at the back of this manual, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the antenna unit and one hole of 25-30 mm diameter for the signal cable.

Fastening the radiator to the radiator bracket

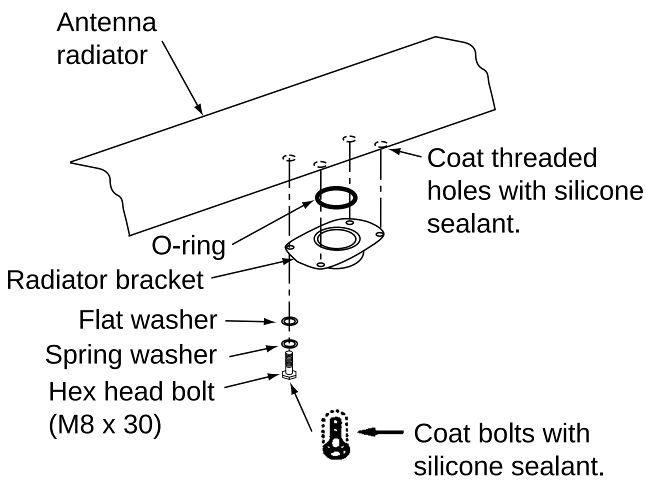
For your reference, the antenna installation materials list appears in the packing list for this unit at the back of this manual.

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between the antenna radiator and the radiator bracket with silicone sealant as shown in the figure below.



Coating the antenna with silicone sealant

3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the antenna radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.



Fastening the radiator bracket to the antenna unit chassis

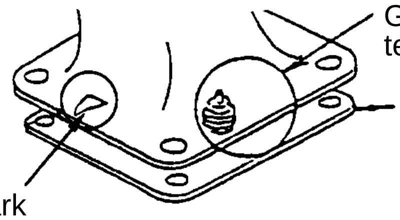
Mounting the antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200 x 200 mm) or inside (140 x 150 mm) the antenna unit.

Using outside fixing holes of the antenna housing

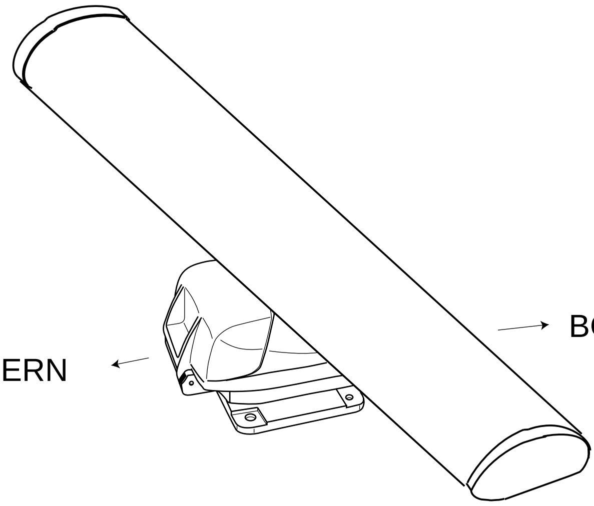
Use the hex head bolts (supplied) to mount the antenna unit as below.

1. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.



Location of rubber mat

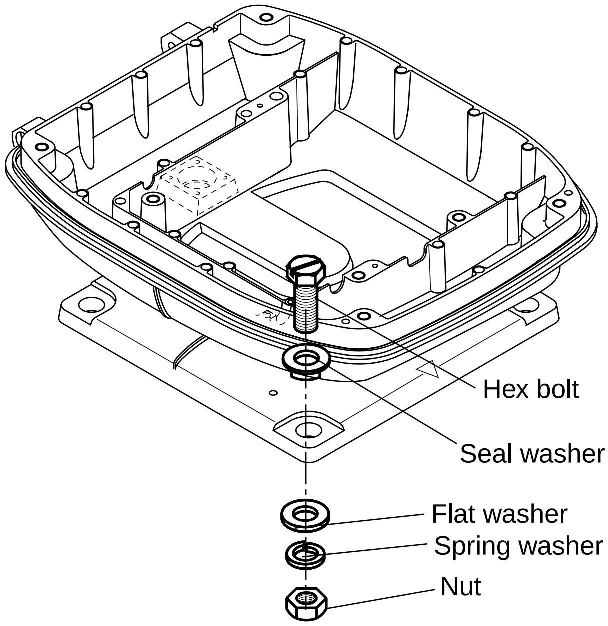
2. Lay the antenna unit on the mounting platform, orienting it as shown in below.



Antenna unit

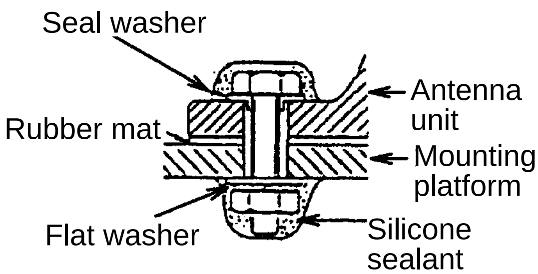
> ⚠ **CAUTION**
>
> **Do not lift the Antenna unit by the radiator; lift it by the housing.**
>
> The radiator may be damaged.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing, as shown below.



Fixing the antenna unit chassis

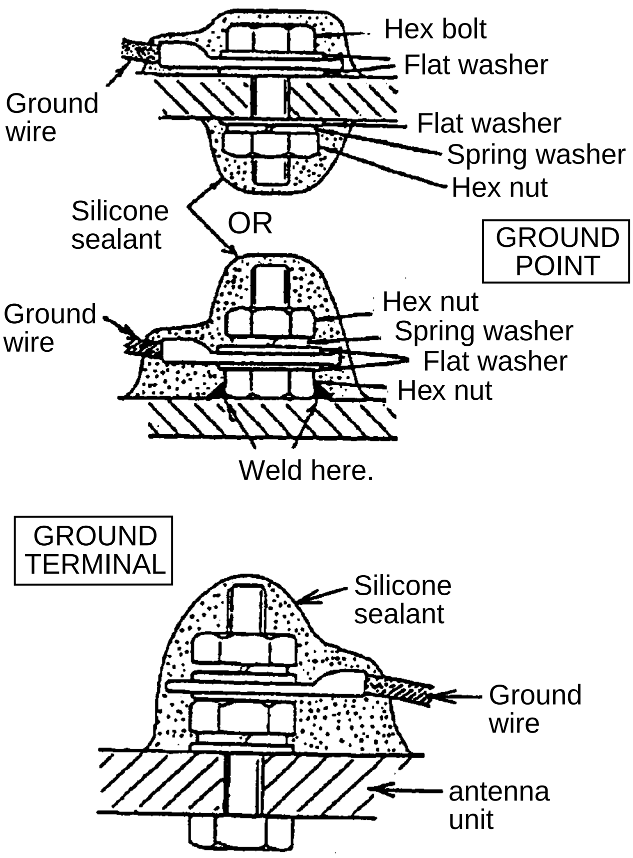
4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.



How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point in mounting platform (within 300 mm of ground terminal on antenna unit) using M6 x 25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.

8. Coat ground terminal and ground point with silicone sealant as shown below.

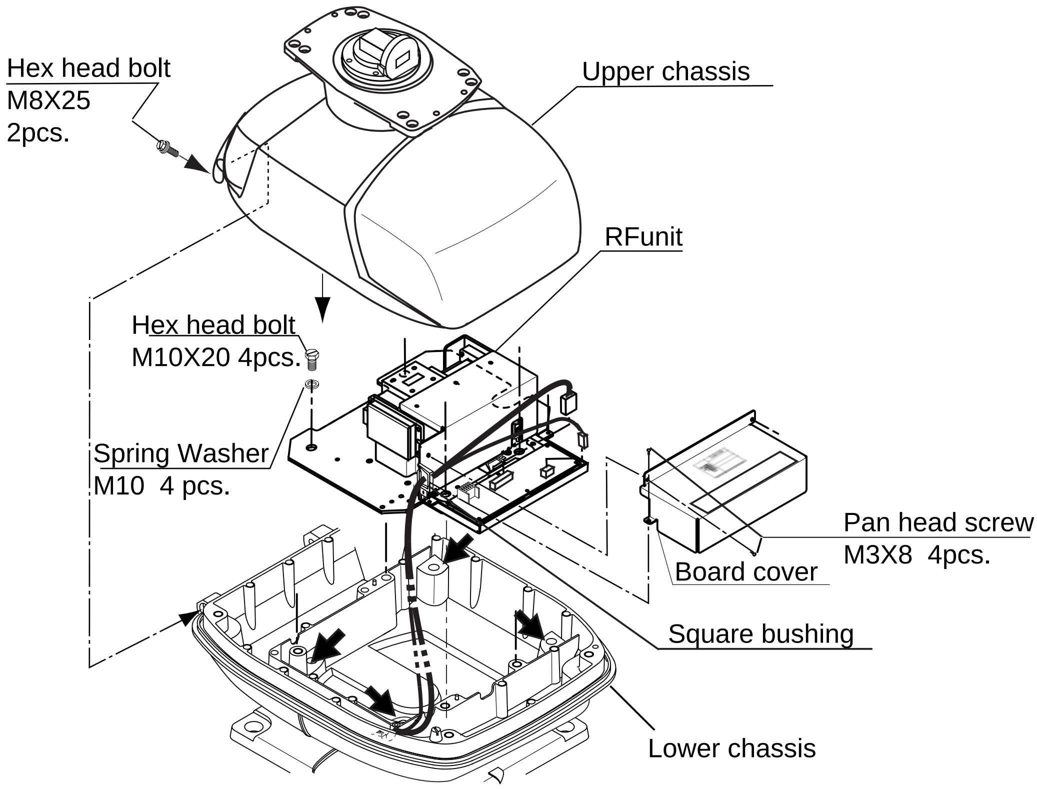


How to coat ground point and ground terminal with silicone sealant

Using inside fixing holes of the antenna housing

This method requires removal of the RF unit in the antenna unit to access inside fixing holes. Use hex head bolts, flat washers, spring washers and nuts (local supply) to mount the antenna unit, confirming length of bolts.

1. Unfasten four scanner bolts on the cover to open the antenna unit.
2. Unplug connector connected between upper and lower chassis.
3. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
4. Remove the board cover by unfastening four pan head screws.
5. Remove connector from RF unit.
6. Remove RF unit by unfastening four hex head bolts.



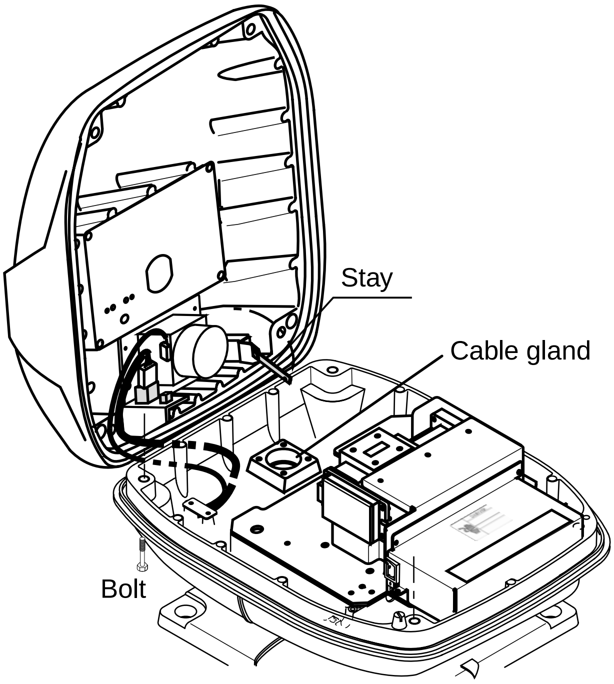
Antenna unit chassis, upper chassis separated

7. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
8. Fasten the lower chassis to the mounting platform with hex head bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in the rubber bushing and insert bolt into the bushing. Do not use seal washers.
9. Reassemble RF unit, cover and chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in “Outside fixing holes”.

Connecting the signal cable

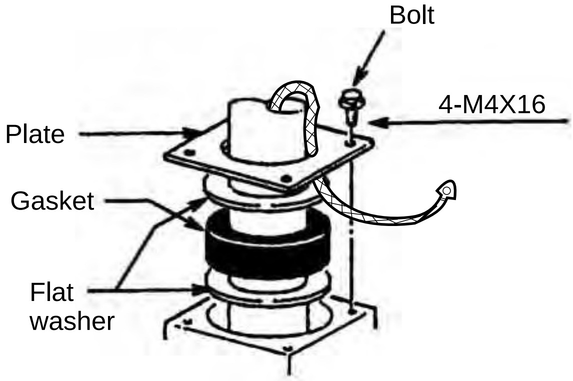
Only the signal cable runs from the display unit (power supply unit in case of 1954C) to the antenna unit. In order to minimize the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also, avoid running the cable in parallel with power cables. Pass the cable through the hole and apply sealing compound around the hole for waterproofing.

1. Open the antenna cover by loosening four bolts, and then fix the stay.



Antenna unit chassis, cover opened

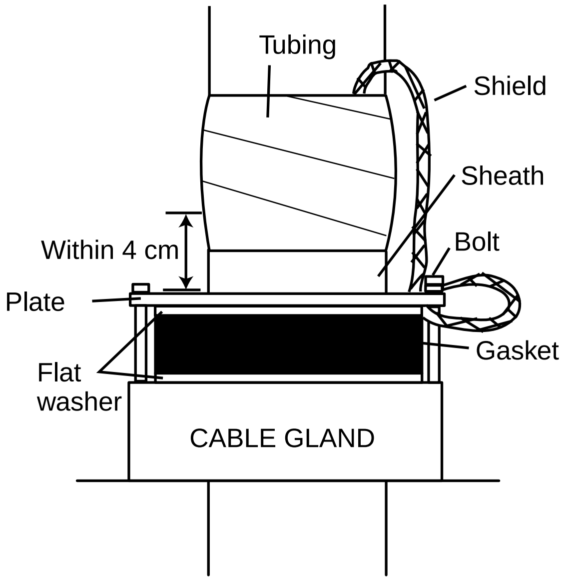
2. Unfasten the cable gland assembly (plate, gasket, flat washer).
3. Pass the signal cable with connector through the bottom of the antenna unit chassis. Pass the cable through the gland assembly as shown below.



Passing the signal cable through the cable gland assembly

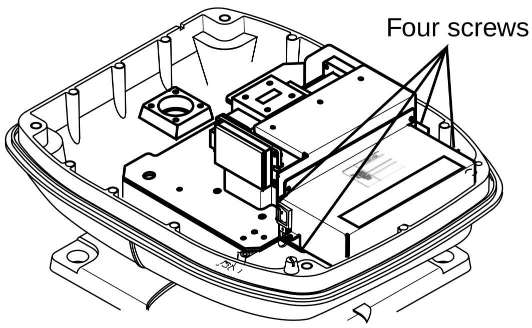
4. Fasten the crimp-on lug on the shield to one of the fixing bolts of the cable gland assembly.

5. Position the signal cable so that no more than 4 cm of the sheath is exposed as shown in the figure below. Tighten fixing bolts.



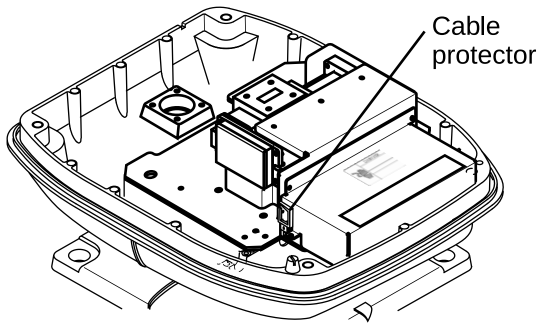
How to fix signal cable in cable gland

6. Unfasten four screws shown in the figure below.



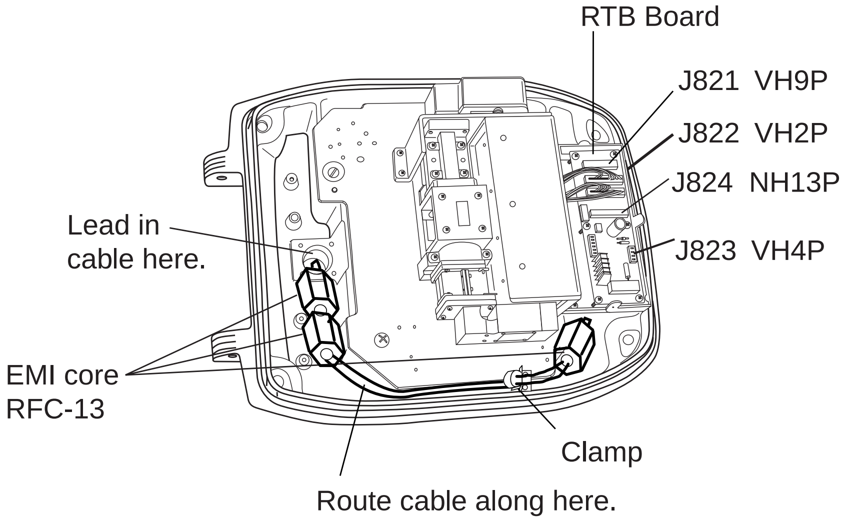
Antenna unit chassis, cover opened

7. Pass the signal cable through the cable protector.



Antenna unit chassis, cover opened

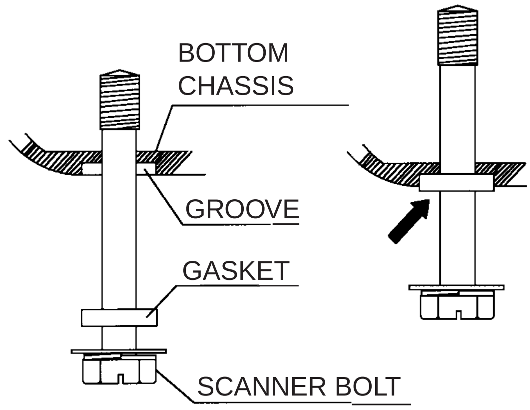
8. Connect the signal cable to the RTB Board (03P9249 or 03P9250), referring to the interconnection diagram and the figure below.
9. Attach three EMI cores to the signal cable as shown below.



Antenna unit chassis, cover opened

10. Fix the signal cable with the cable clamp.
11. Release the stay and close the cover. Loosely fasten the scanner bolts; you will have to make some adjustments inside after completion of wiring.

Note: When closing the cover, set the gaskets to grooves in the bottom chassis, then tighten bolts.



Torque : 9.8 ±0.1 N·m

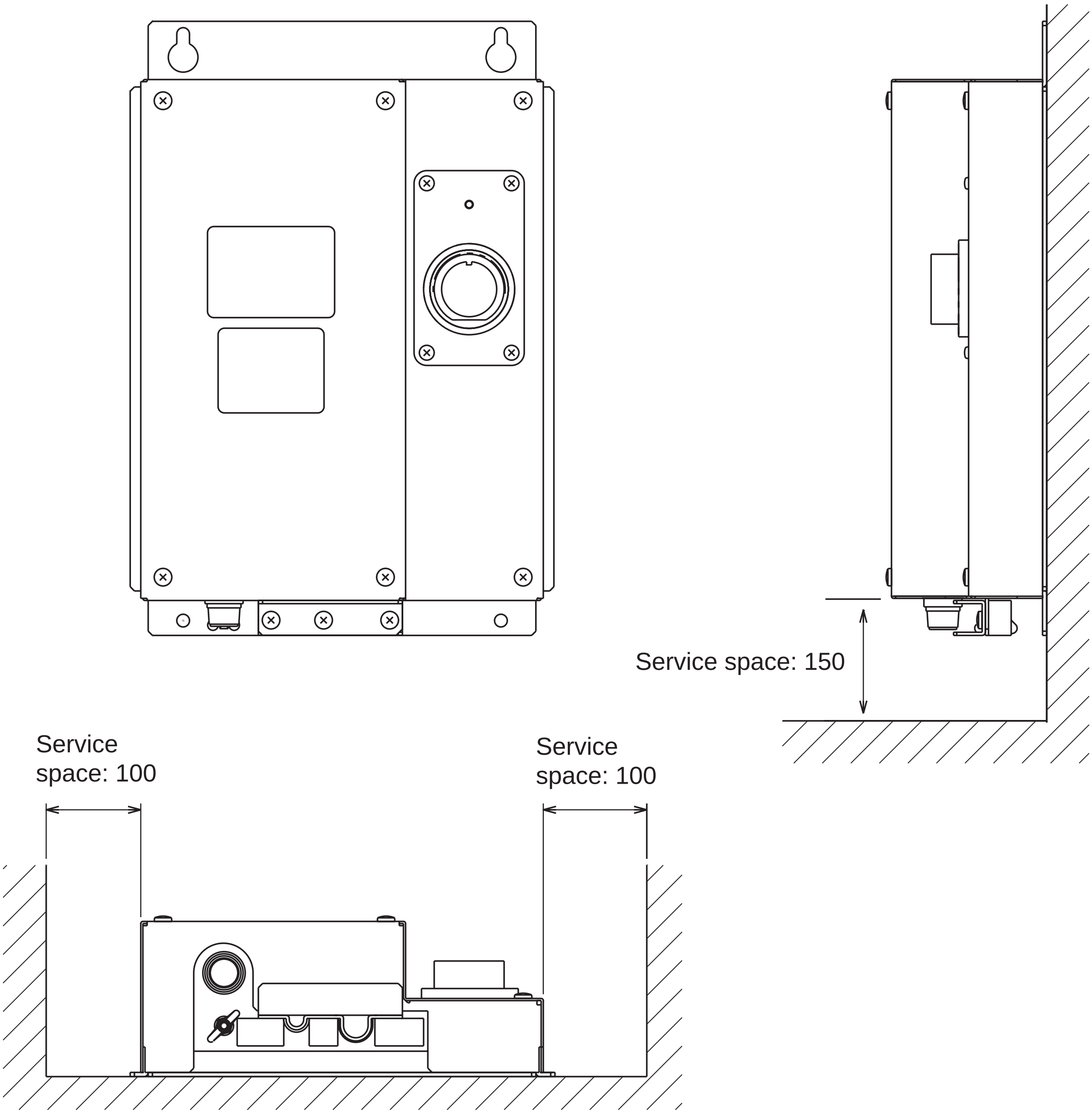
1.5 Mounting the Power Supply Unit (MODEL 1954C/1964C)

1.5.1 Power supply unit PSU-005 (for MODEL 1954C)

A power supply unit is shipped with the MODEL1954C, because of its high power consumption.

The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided and is installed within 5 m (cable length) from the display unit.

Note: Do not install the power supply unit on the overhead; install it on the deck or bulkhead.



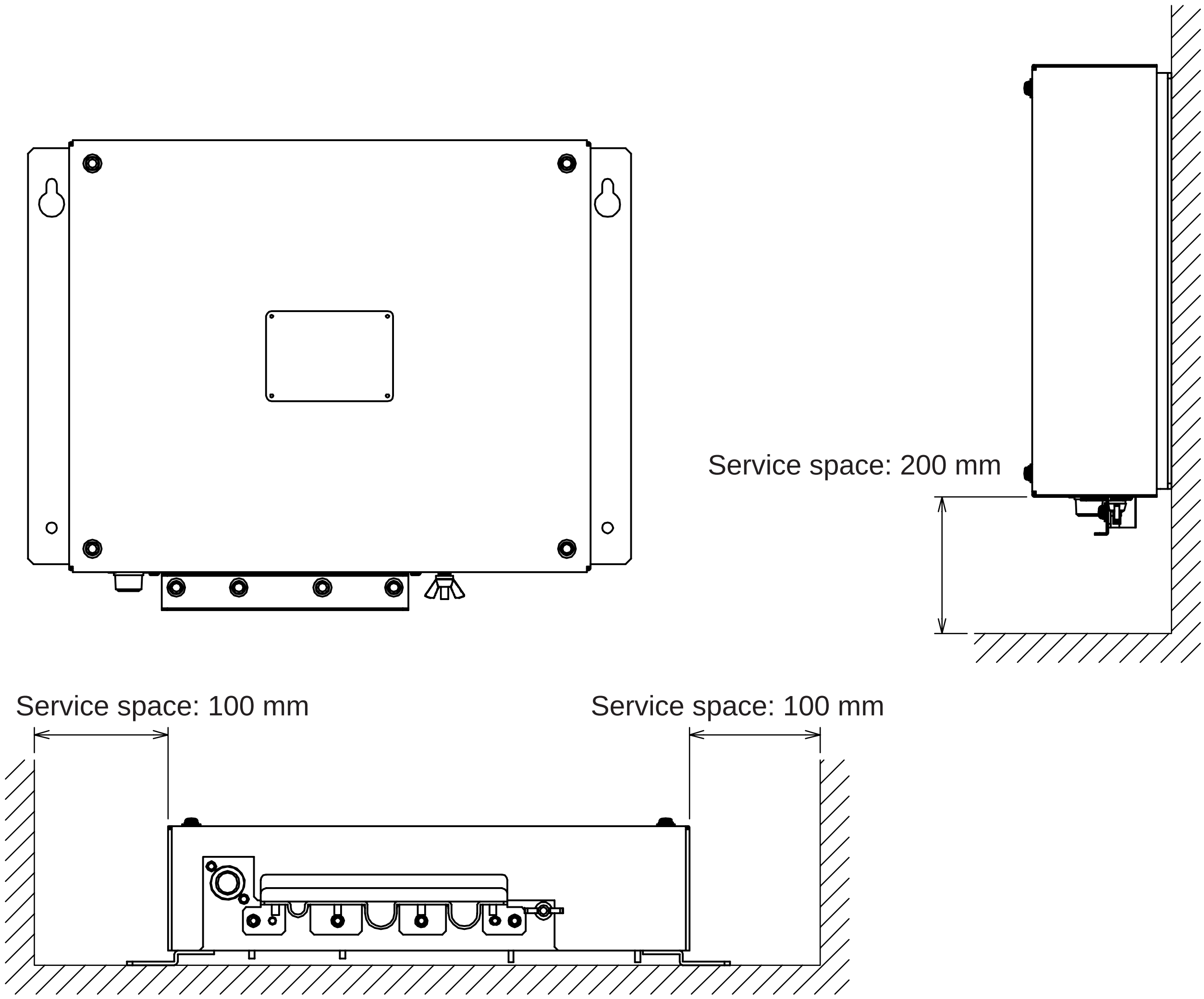
Power supply unit

1.5.2 Power supply unit PSU-008 (for MODEL 1964C)

A power supply unit is shipped with the MODEL1964C, because of its high power consumption.

The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided and is installed within 5 m (cable length) from the display unit.

Note: Do not install the power supply unit on the overhead; install it on the deck or bulkhead.

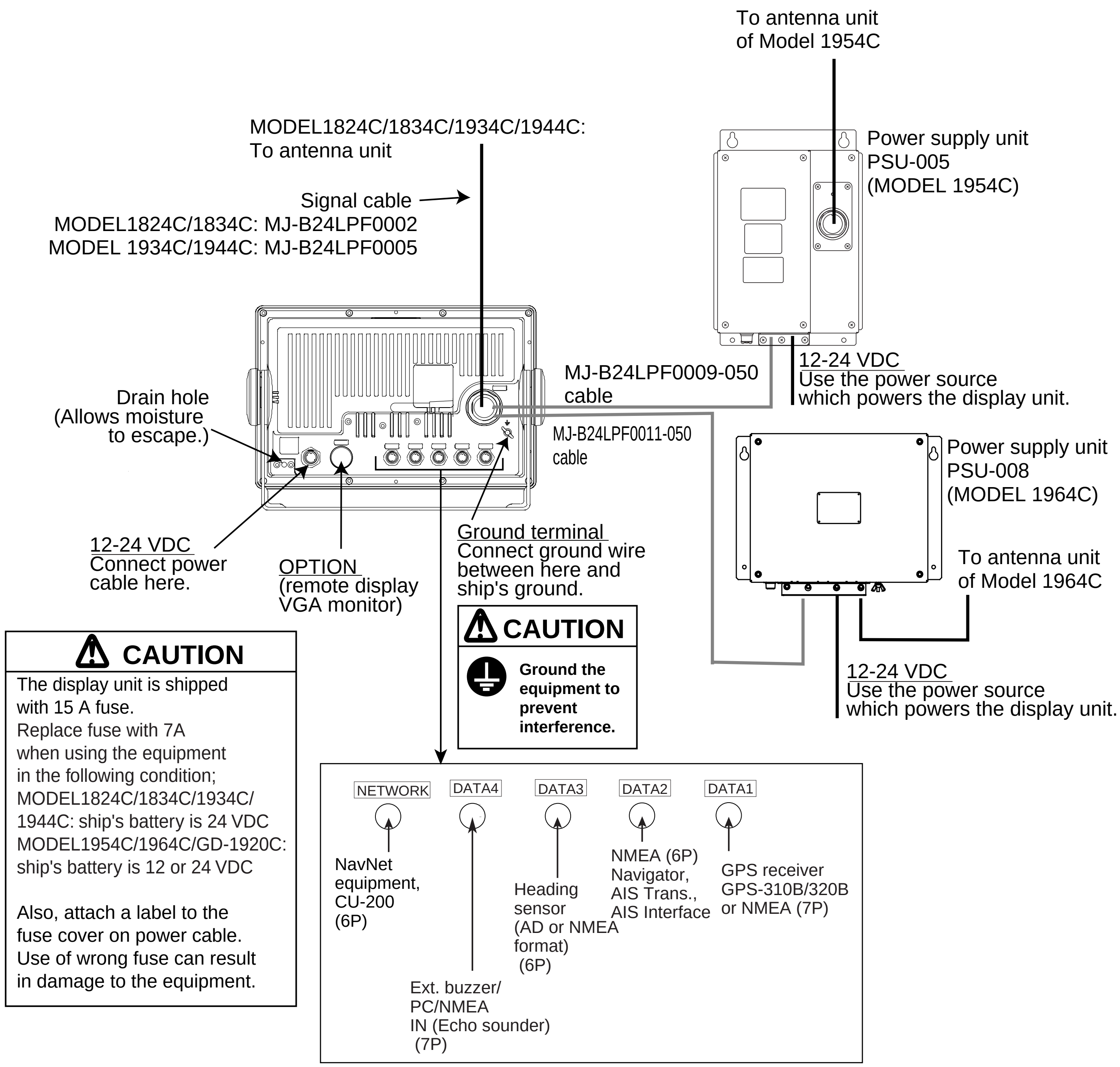


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2. WIRING

2.1 Standard Wiring

All wiring is terminated at the rear of the display unit.



Display unit, rear view

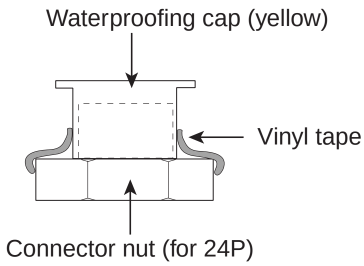
12-24 VDC

Connect the power cable to the POWER connector at the back of the display unit.

DJ-1

For MODEL1824C/1834C/1934C/1944C/1954C/1964C, remove the waterproofing cap from DJ-1 port and discard it.

MODEL1824C/1834C:	Connect the MJ-B24LPF0002 cable from the antenna unit to this port.
MODEL1934C/1944C:	Connect the MJ-B24LPF0005 cable from the antenna unit to this port.
MODEL 1954C/1964C:	Connect the cable MJ-B24LPF0009 from the power supply unit to this port.
GD-1920C:	Do not remove the waterproofing cap. Wrap the connector nut and cap with vinyl tape as shown below.



Waterproofing cap and connector nut, sectional view

Ground terminal

Connect the ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

DATA1 to DATA4

Other equipments can be connected here as shown below.

DATA1 (7P)	DATA2 (6P)	DATA3 (6P)	DATA4 (7P)
GPS receiver GP-310B/320B	NMEA sentence (ex. Navaid)	Heading sensor (ex. SC-50/110) (MODEL series only)	External buzzer, PC, NMEA IN (Echo sounder)

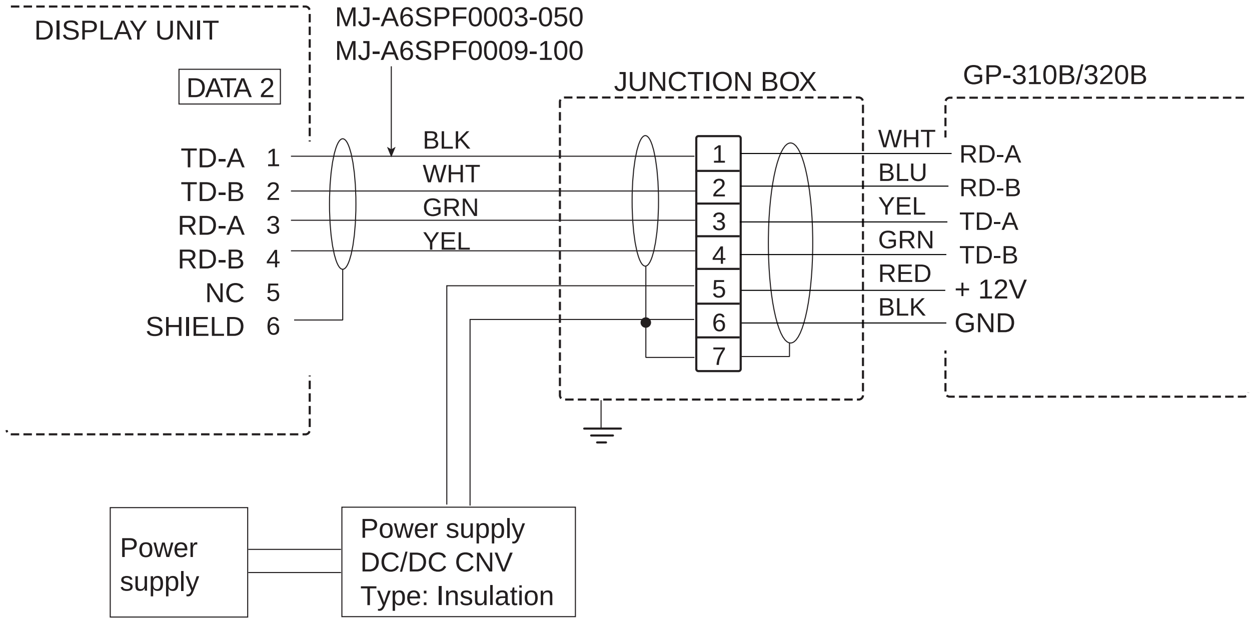
This equipment can receive the following NMEA 0183 format sentence from other equipments. You will need the optional NMEA cable to connect with external equipment.

- Own ship's position: GGA>RMC>RMA>GLL
- Time: ZDA>RMC
- Ship's speed: RMC>RMA>VTG>VHW
- Other ship's information: TTM
- Wind speed and angle: MWV>VWT/VWR
- Heading (True): HDT>HDG>HDM>VHW
- Heading (Magnetic): HDM>HDG>HDT>VHW
- Course: RMC>RMA>VTG
- Depth: DPT>DBT>DBS>DBK
- Destination waypoint: RMB
- Water temperature: MTW
- Target data: TLL (output from VHF radiotelephone FM-2721)
- DSC information: DSC>DSE (output from VHF marine transceiver FM-3000)

Connecting GP-310B/320B to DATA 2 port

When some equipment is connected to DATA 1 port, GPS receiver GP-310B/320B can be connected to DATA 2 port as shown below.

You need a junction box and optional cable MJ-A6SPF0003-050 or MJ-A6SPF0009-100.



Connecting GP-310B/320B to DATA 2 port

NETWORK port

Other NavNet equipment should be connected to this port with the optional MJ-A6SPF0014 cable. Available equipments are shown below.

Radar	Plotter	Network sounder	Other
MODEL1724C/1734C 1824C/1834C/1934C/ 1944C/1954C/1964C	GD-1720C GD-1920C	ETR-6/10N ETR-30N	HUB (used when more than two NavNet units are connected.)

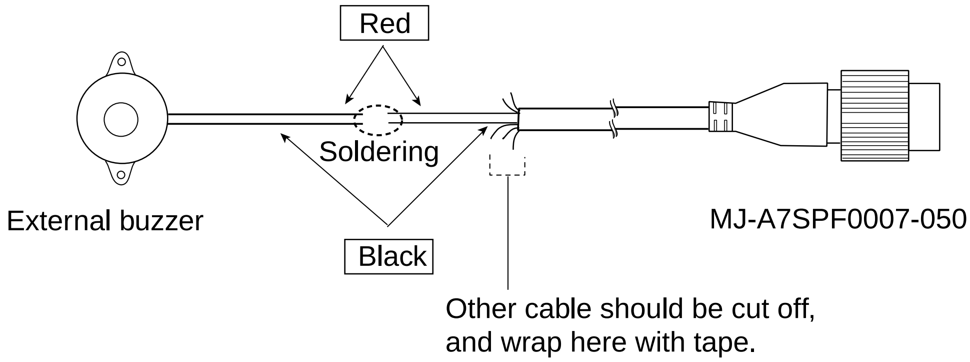
2.2 External Buzzer (optional supply)

The optional external buzzer provides a louder alert when the alarm is violated.

<u>External buzzer</u>
Type: OP03-136
Code no.: 000-086-443

Further, you need the optional cable assy MJ-A7SPF0007-050 (w/7P connector, 5 m, code no. 000-144-418).

1. Attach the MJ-A7SPF0007-050 cable assy (option) to the DATA 4 port at the rear of the display unit.
2. Cut the XH connector at the end of the external buzzer cable with appropriate length.
3. Solder the cables made at step 2 with MJ-A7SPF0007-050 cable as shown below.

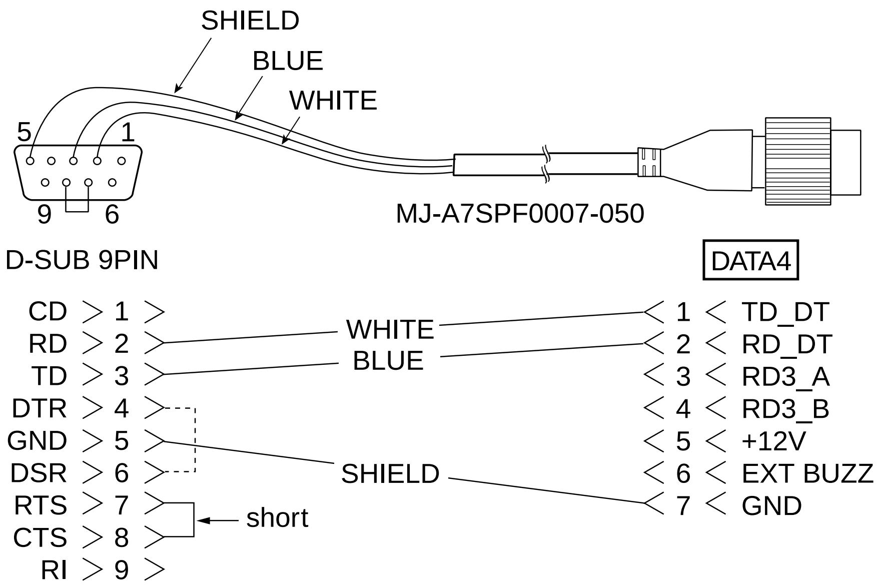


Connection of external buzzer and display unit using cable assy type MJ-A7SPF0007-050 cable

4. Attach the buzzer to the mounting location with the double-sided tape or two tapping screws (3x15 or 3x20, local supply).

2.3 How to Connect with a PC

When connecting with the personal computer, prepare the optional cable assy MJ-A7SPF0007-050 and D-sub 9 pins plug (local supply), and connect them as follows.

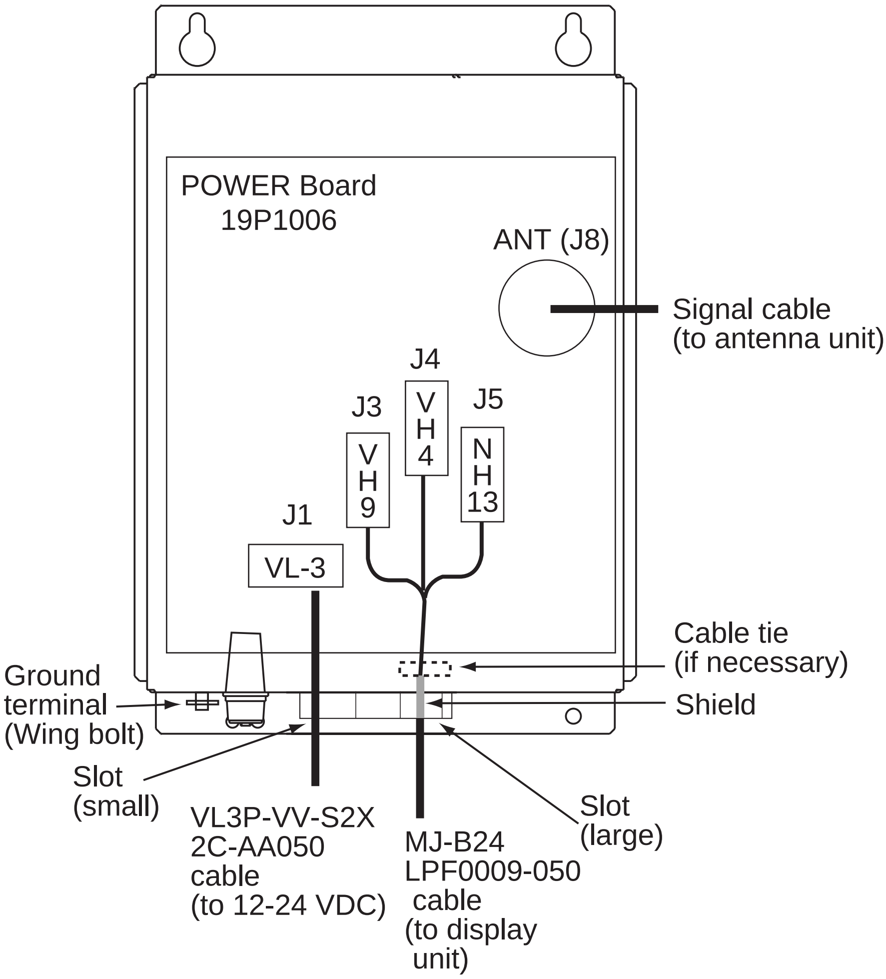


MJ-A7SPF0007-050 cable connection for PC

2.4 Wiring the Power Supply Unit (MODEL 1954C/1964C)

2.4.1 Power supply unit PSU-005 (MODEL1954C)

1. Unfasten three M4 screws to remove the cable clamp.
2. Unfasten six M4 screws to remove the cover.
3. Attach the VL connector of the power supply cable VL3P-VV-S2X2C-AA050 (supplied as installation materials) to J1 on the POWER Board.
4. Attach the VH and NH connectors of MJ-B24LPF0009-050 cable (supplied as installation materials) to these locations: VH9, J3; VH4, J4, NH13, J5.



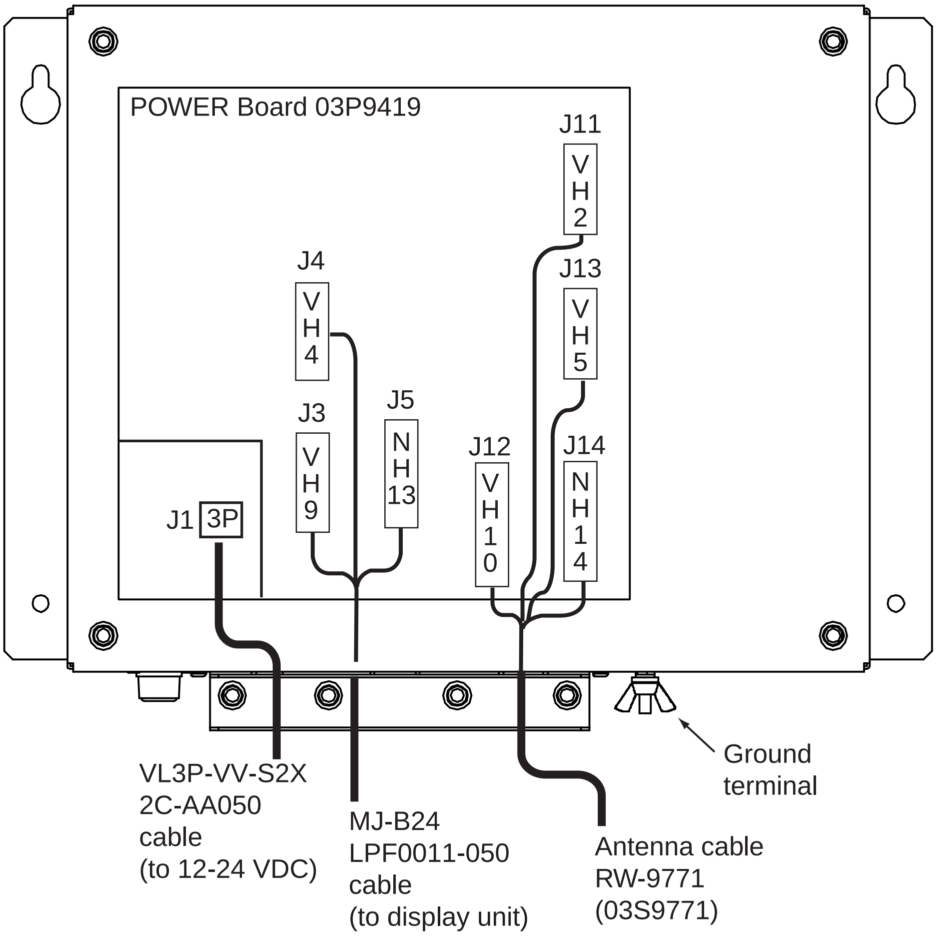
Power supply unit, cover removed

5. Lay two cables on the slots referring to the figure above.
   To prevent strain to the cable MJ-B24LPF0009-050, fasten a cable tie (local supply) at the position shown above.
6. Reattach the cover (removed at step 2).
7. Reattach the cable clamp.
8. Connect the antenna cable to the ANT port on the power supply unit.
9. Connect a ground wire (local supply, IV-2sq) between the ground terminal and ship’s ground.

2.4.2 Power supply unit PSU-008 (MODEL1964C)

Cabling

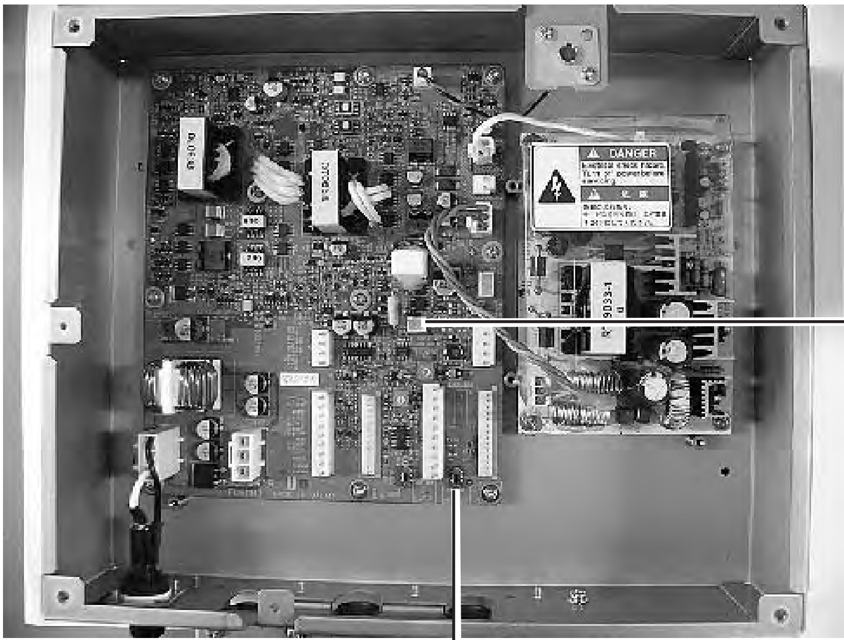
1. Unfasten four screws to remove the cable clamp.
2. Unfasten four screws to remove the cover.
3. Attach the VL connector of the power supply cable VL3P-VV-S2X2C-AA050 (supplied as installation materials) to J1 on the POWER Board.
4. Attach the VH and NH connectors of MJ-B24LPF0011-050 cable (supplied as installation materials) to these locations: VH9, J3; VH4, J4, NH13, J5.



5. Connect the antenna cable to these locations: VH2, J11, VH10, J12; VH5, J13, NH14, J14.
6. Lay three cables in respective slots referring to the figure above.
7. Reattach the cover (removed at step 2).
8. Reattach the cable clamp.
9. Connect a ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

Jumper block, slide switch setting

The jumper block JP1 and slide switch S112 on the PWR board (03P9419) must be set according to radar model. Open the unit, locate JP1 and S112 and set them as below.



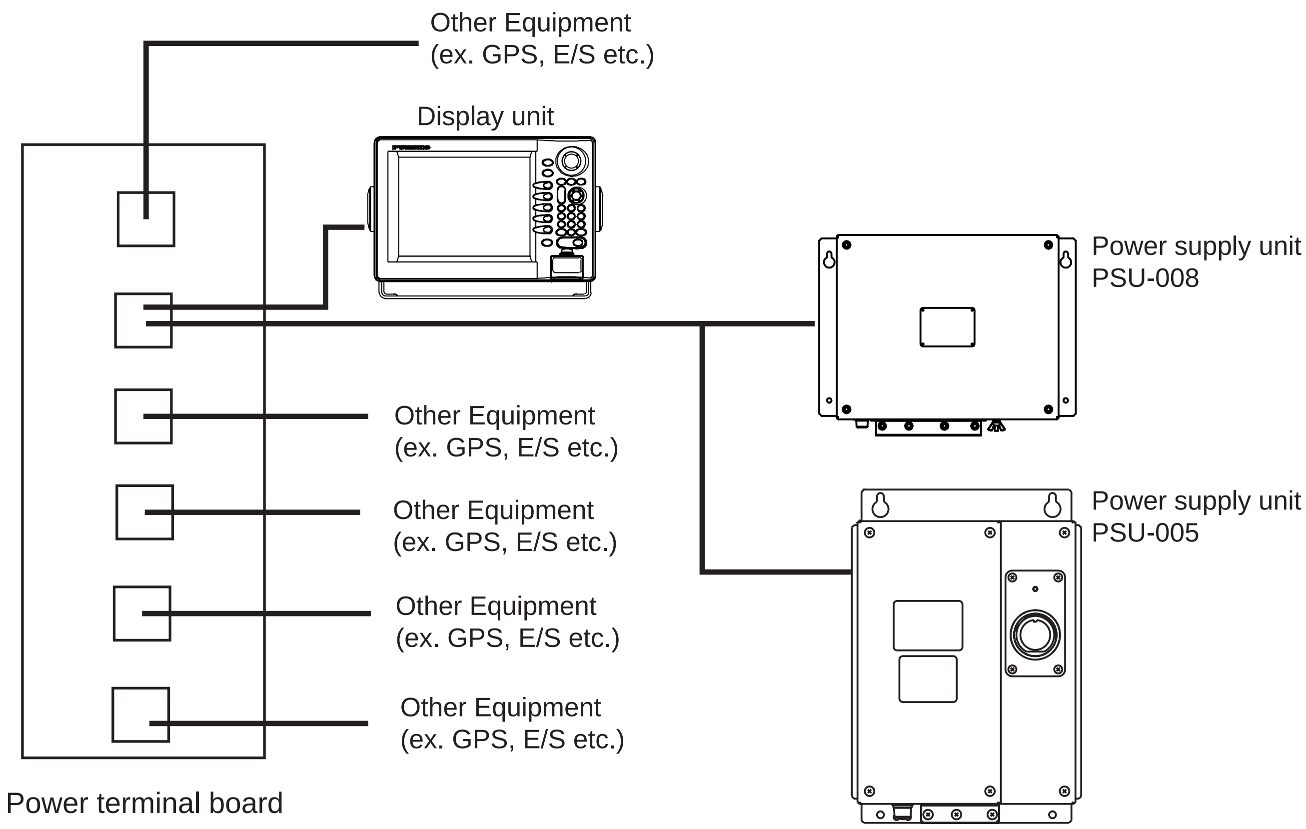
Power supply unit, inside view

Jumper block, slide switch	Function	Setting
JP1	Enables/disables motor slow start circuit.	Open (enable)
S112	TUNE voltage selector (0-12 V, 0-32 V)	Downward position (0-32 V)

2.4.3 Power requirement, replacement of fuses

Power requirement

The power for the power supply unit and display unit must be drawn from the same power switch on the power terminal board.



⚠ CAUTION
The display unit and antenna should be powered from the same power source. This should be done so the antenna will rotate only when the display unit is turned on.

Replacement of fuses

The power supply unit is shipped with 15 A fuse. Replace fuse with 7 A (supplied) when the ship's battery is 12 or 24 VDC.

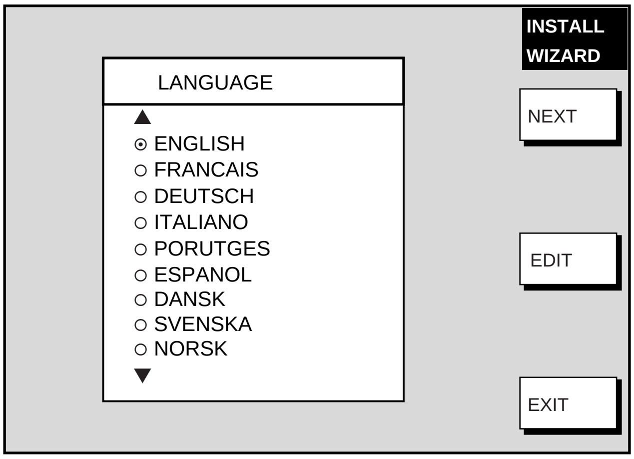
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3. SETTING UP THE EQUIPMENT

3.1 Setting up with the Installation Wizard

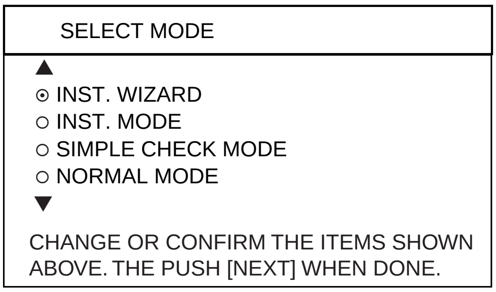
After you have installed the equipment, set up the equipment with the installation wizard. The wizard allows you to easily set up the NavNet network (choose source of radar, sounder and auxiliary), GPS, ports, etc.

1. Press the **POWER/BRILL** key to turn on the power, and the following screen appears.



Installation wizard, language selection window

2. Rotate the **ENTER** knob to choose the appropriate language and then push the ENTER soft key.
3. A dialog box asks you if you want to start the simulation mode, which provides simulated operation of the equipment.
4. Press the **CLEAR** key to skip the simulation mode. Then, the SELECT MODE window appears. When confirming connections only, the simple check mode is useful.



5. Confirm that INST. WIZARD is selected, and then push the ENTER soft key.
   A diagnostic test is conducted and then the chart disclaimer message appears.
6. You are then asked “LOAD SETTING DATA FROM CARD?”. This allows you to use the set up this NavNet unit with the settings of another NavNet unit, thereby shortening the time required to set up the equipment. To use the settings of another NavNet unit, insert the appropriate SD card in the slot and push the **ENTER** knob. If not, hit the **CLEAR** key. If you loaded settings, the message “LOADING COMPLETED. REMOVE THE CARD AND PRESS ANY KEY TO RESTART” appears if loading was successful. Remove the card and press any key to restart the equipment; installation is completed. To set up manually, go to step 7.

CAUTION: Ensure that the settings to be loaded are compatible with this NavNet unit. Improper setting will damage the equipment.

7. The screen for set up of units of measurement appears.

▶ RANGE UNIT	nm, kt
DEPTH UNIT	ft
TEMPERATURE UNIT	˚F
WIND UNIT	kt
LOCAL TIME OFFSET	+00:00
LOCAL TIME OFFSET	+00:00
AIR PRESSURE UNIT	hpa

Installation wizard, units of measurement

8. Choose an item and then press the EDIT soft key. One of the following windows appears.

RANGE/SPEED UNIT

▲
○ nm, kt
⊙ km, km/h
○ sm, mph
○ nm & yd, kt
○ nm & m, kt
○ km & m, km/h
○ sm & yd, mph
▼

DEPTH UNIT

▲
○ m
⊙ ft
○ fa
○ PB
▼

TEMPERATURE UNIT

▲
○ °C
⊙ °F
▼

WIND UNIT

▲
○ kt
⊙ km/h
○ MPH
○ m/s
▼

LOCAL TIME OFFSET

+ 0 0 : 0 0

AIR PRESSURE UNIT

▲
⊙ hpa
○ mbar
○ mmHg
○ inHg
▼

9. Choose unit of measurement desired and then press the ENTER soft key. LOCAL TIME OFFSET allows you to use local time (instead of UTC time). Set the time difference between local time and UTC time.
10. After you have chosen units of measurement, press the NEXT soft key, and the NETWORK SETUP menu appears. This is where you set up your NavNet network. See the illustration on the next page for typical network setup. **If you have no other NavNet devices installed, press the NEXT key and go to step 13.**

▶ DEVICE NUMBER	1
(HOST NAME	NAVNET-1)
(IP ADDRESS	172.031.003.003)
RADAR SOURCE	1
SOUNDER SOURCE	ETR0
AUX SOURCE	AUX1

FOR FURTHER DETAILS,
PLEASE REFER TO THE
INSTALLATION MANUAL

Installation wizard, network setup

11. Choose appropriate item and then press the EDIT soft key. One of the following displays appears depending on your selection.

DEVICE NUMBER

▲
- ○ 1 (IP:172.031.003.001)
- ⊙ 2 (IP:172.031.003.002)
- ○ 3 (IP:172.031.003.003)
- ○ 4 (IP:172.031.003.004)

▼

RADAR SOURCE

▲
- ○ 1 (IP:172.031.003.001)
- ⊙ 2 (IP:172.031.003.002)
- ○ 3 (IP:172.031.003.003)
- ○ 4 (IP:172.031.003.004)
- ○ NO CONNECT

▼

SOUNDER SOURCE

▲
- ○ ETR0 (IP:172.031.092.001)
- ⊙ ETR1 (IP:172.031.092.011)
- ○ ETR2 (IP:172.031.092.012)
- ○ ETR3 (IP:172.031.092.013)
- ○ ETR4 (IP:172.031.092.014)
- ○ ETR5 (IP:172.031.092.015)
- ○ ETR6 (IP:172.031.092.016)
- ○ ETR7 (IP:172.031.092.017)
- ○ ETR8 (IP:172.031.092.018)
- ○ ETR9 (IP:172.031.092.019)
- ○ OFF

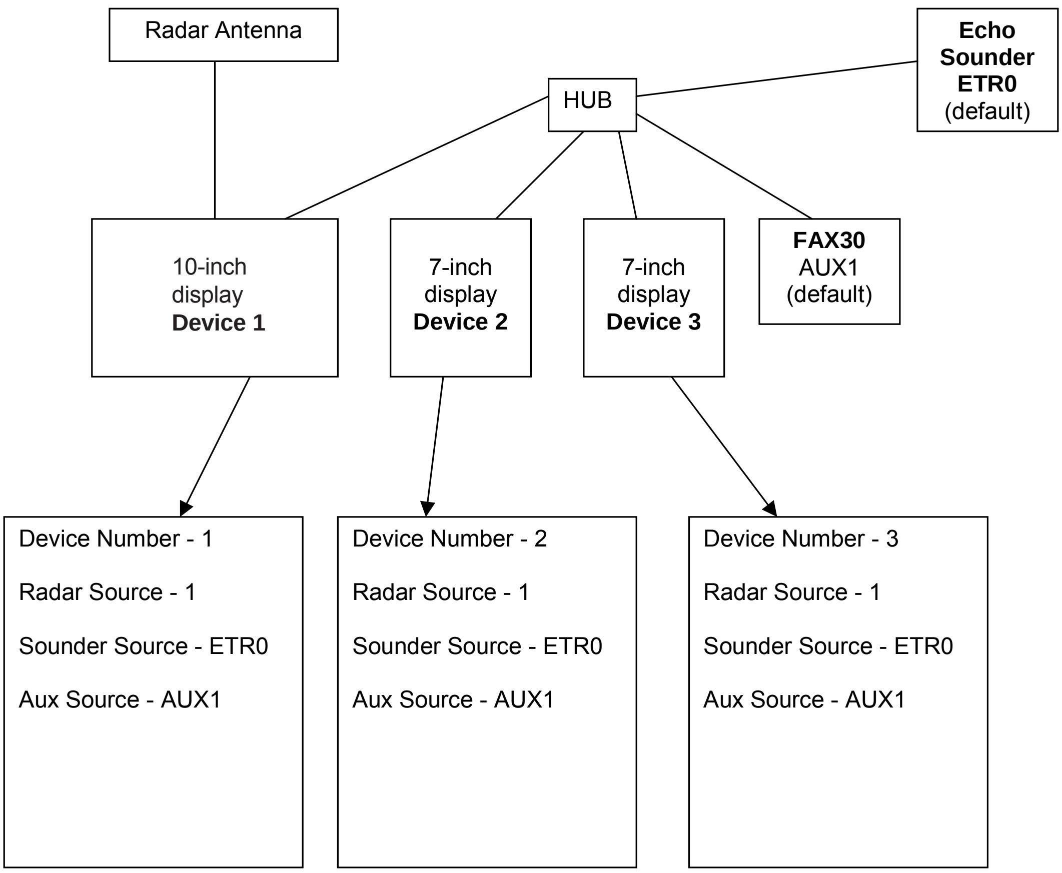
▼

AUX SOURCE

▲
- ⊙ AUX1 (IP:172.031.008.001)
- ○ AUX2 (IP:172.031.008.002)
- ○ AUX3 (IP:172.031.008.003)
- ○ AUX4 (IP:172.031.008.004)
- ○ OFF

▼

12. Choose appropriate setting and then press the ENTER soft key. If you set DEVICE NO. or RADAR SOURCE, turn the power on and off again at the completion of the installation wizard.



13. After choosing ALL sources, press the NEXT soft key, and the RADAR SETUP menu appears. **If you do not have a radar installed, go to step 33.**

►ANTENNA TYPE	A
HEADING DATA	MAGNETIC
ANTENNA ROTATION	ROTATE
RADAR OPTIMIZATION	OFF
TIMING ADJUST	OFF
M. B. SUPRRESSION	OFF
RADAR ANTENNA HEIGHT	MEDIUM (3-10m, 10-33ft)
STC CURVE	MEDIUM
MONITOR MODE	OFF
HEADING ADJUST	OFF

Installation wizard, radar setup

14. Choose ANTENNA TYPE and then press the EDIT soft key.

ANTENNA TYPE
▲
○ A (MODEL 1824C)
⊙ B (MODEL 1834C)
○ C (MODEL 1934C)
○ D (MODEL 1944C)
○ E (MODEL 1954C)
○ F (MODEL 1964C)
▼

15. Choose the appropriate antenna type and then press the ENTER soft key.
16. Choose HEADING DATA and then press the EDIT soft key.

HEADING DATA
▲
○ MAGNETIC
⊙ TRUE
▼

17. Choose the appropriate heading data format and then press the ENTER soft key. Select MAGNETIC when connecting with a magnetic compass, or select TRUE when connecting with a gyrocompass or satellite compass.
18. Choose ANTENNA ROTATION and then press the EDIT soft key.

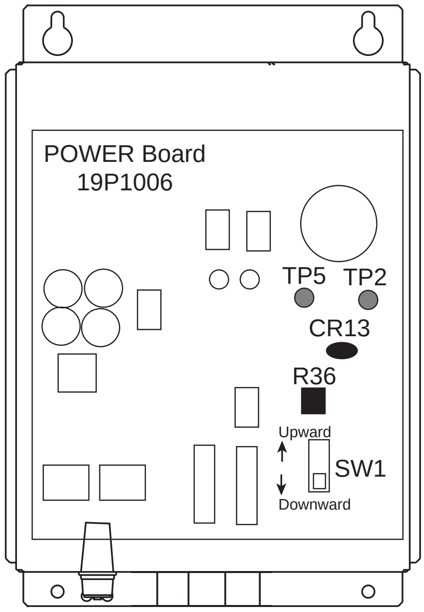
ANTENNA ROTATION
▲
⊙ ROTATE
○ STOP
▼

19. Choose ROTATE (other than MODEL 1954C or 1964C) or STOP (MODEL 1954C or 1964C) and then press the ENTER soft key.

    For the MODEL 1954C or 1964C, follow the procedure in the illustration at the top of the next page. For other models, go to step 20.

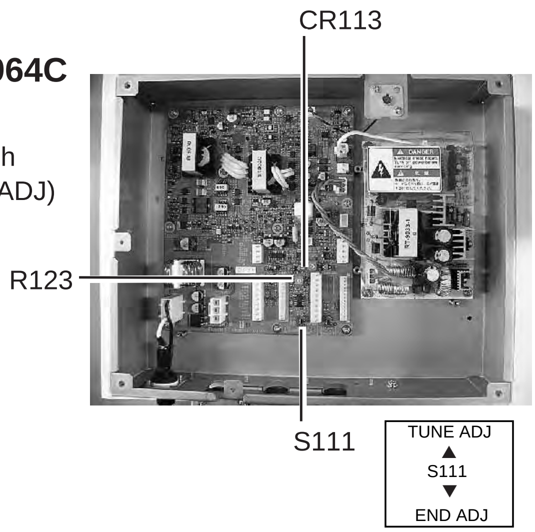
Tuning Power Supply Unit for MODEL 1954C

1. Choose TIMING ADJUST and then press the EDIT soft key.
2. Choose ON and then press the ENTER soft key.
3. You are asked if you want to transmit; push the ENTER knob.
4. Use the **RANGE** key to choose the 6nm range.
5. Press the RETURN soft key.
6. Open the power supply unit cover and flip switch SW1 on the POWER Board upward (tuning position).
7. Adjust potentiometer R36 clockwise so that CR13 LED lights in the highest brilliance.
8. Flip switch SW1 switch downward (default setting).
9. Set ANTENNA ROTATION to ROTATE.
10. Reassemble the cover of the power supply unit.
11. Go to step 20.



Tuning Power Supply Unit for MODEL 1964C

1. Follow step 1-5 above.
2. Open the power supply unit cover and flip the switch S111 on the POWER Board to the upward (TUNE ADJ) position.
3. Adjust potentiometer R123 clockwise so that LED CR113 lights in the highest brilliance.
4. Flip the switch S111 to the downward (END ADJ) position.
5. Set ANTENNA ROTATION to ROTATE.
6. Reassemble the cover of the power supply unit.
7. Go to step 20.



20. Choose RADAR OPTIMIZATION and then press the EDIT soft key.

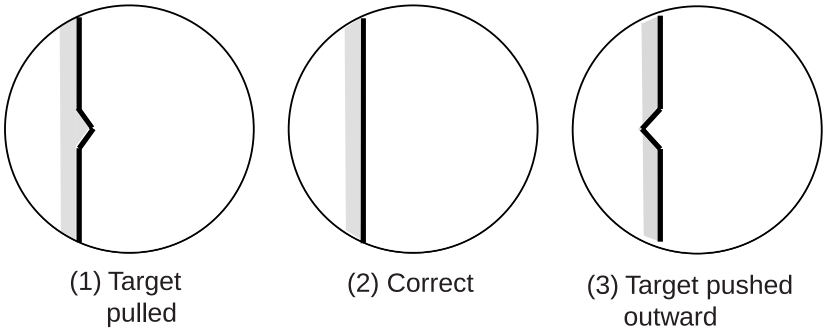
RADAR OPTIMIZATION
▲ ○ ON ⊙ OFF ▼

21. Choose ON and then press the ENTER soft key. Then, the radar's video and tuning are automatically adjusted.
22. After tuning has been completed, choose TIMING ADJUST and then press the EDIT soft key.

TIMING ADJUST
▲ ○ ON ⊙ OFF ▼

This adjustment ensures proper radar performance, especially on short ranges. The radar measures the time required for a transmitted echo to travel to the target and return to the source. The received echo appears on the display based on this time. Thus, at the instant the transmitter is fired, the sweep should start from the center of the display (sometimes called sweep origin.)

A trigger pulse generated in the display unit goes to the antenna unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the antenna unit varies, depending largely on the length of signal cable. During this period the display unit should wait before starting the sweep. When the display unit is not adjusted correctly, the echoes from a straight local object (for example, a harbor wall or straight pier) will not appear with straight edges – namely, they will be seen as "pushed out" or "pulled in" near the picture center. The range of objects will also be incorrectly shown.



Examples of improper and correct sweep timing

a) Choose ON and then press the ENTER soft key.
b) Transmit on the shortest range and confirm that gain and A/C SEA are properly adjusted.
c) Visually select a target which forms straight line (harbor wall, straight piers).
d) Rotate the **ENTER** knob to straighten the target selected at step b), and then press the **ENTER** knob to finish.

23. Choose M. B. SUPPRESSION and press the EDIT soft key.

M. B. SUPPRESSION
▲ ○ ON ⊙ OFF ▼

24. Choose ON and then press the ENTER soft key. Main bang is the "black hole" which appears at the display center on short ranges. Rotate the ENTER knob to suppress the main bang. After adjusting, press the RETURN key.
25. Choose RADAR ANTENNA HEIGHT and then press the EDIT soft key.

RADAR ANT. HEIGHT
▲ ○ HIGH (>10m, 33ft) ⊙ MEDIUM (3-10m, 10-33ft) ○ LOW (<10m, 33ft) ▼

26. Choose the height of the antenna above the water surface and then press the ENTER soft key.
27. Choose STC CURVE and then press the EDIT soft key.

```
STC CURVE
▲
○ NARROW
⊙ NORMAL
○ WIDE
▼
```

28. Choose appropriate STC curve setting and then press the RETURN soft key.

NARROW: The effective range of the A/C SEA adjustment is relatively short.
NORMAL: Between NARROW and WIDE.
WIDE: The effective range of the A/C SEA adjustment is relatively long.

29. **If you are going to use the equipment as a remote display,** choose MONITOR MODE and then press the EDIT soft key. If not, go to step 31.

```
MONITOR MODE
▲
○ ON
⊙ OFF
▼
```

30. Choose ON and then press the ENTER soft key.
    - TX blanking function is not available when the MONITOR MODE is ON. To set a TX blanking sector, select OFF from MONITOR MODE on the NavNet equipment, and then set the sector same as the main radar. Finally, set MONITOR MODE to ON.
    - When the MONITOR MODE is ON, the following functions are not available.
        - Tuning (auto/manual, on the RADAR SETUP menu)
        - Antenna rotation (RADAR SETUP menu)
        - TX sector blanking (RADAR DISPLAY SETUP menu)
        - Watchman (RADAR DISPLAY SETUP menu)
        - Pulse select (Soft key)
31. Choose HEADING ADJUST and then press the EDIT soft key.

```
HEADING ADJUST
▲
○ ON
⊙ OFF
▼
```

32. Choose ON and then press the ENTER soft key.

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.

a) Set ship's heading toward a suitable target (for example, ship or buoy) at a range between 0.125 and 0.25 nautical mile.

b) Rotate the **ENTER** knob to bisect the target with the EBL and press the SET soft key

c) Press the RETURN soft key.

d) As a final test, move the boat towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

33. The next step is to set up external equipment. Press the NEXT soft key to show the NAV SETUP menu.

►POSITION SOURCE	FURUNO BB GPS
SPEED (STW) SOURCE	ETR
TEMPERATURE SOURCE	ETR
DETPH SOURCE	ETR
STW CALIBRATION	+00%
TEMP CALIBRATION	+00.0°F
DEPTH CALIBRATION	+00ft
WIND AVERAGING	001 seconds(s)
WIND DIRECTION OFFSET	S000.0°
WIND SPEED CALIBRATION	+00%
WIND (MWV) SOURCE	FURUNO BB GPS

STW 12.3 kt	TEMP 56.3°F	DEPTH 99.5ft
WIND SPEED 1.2 kt	WIND DIR 131°	

Page 1

►AIR TEMPERATURE SOURCE	FURUNO BB GPS
AIR PRESSURE SOURCE	FURUNO BB GPS

STW 12.3 kt	TEMP 56.3°F	DEPTH 99.5ft
WIND SPEED 1.2 kt	WIND DIR 131°	

Page 2

Installation wizard, nav setup

34. Choose item and press the EDIT soft key.
35. Choose appropriate setting and then press the ENTER soft key. Refer to the table on next page for description of each item.

<u>*NAV SETUP menu description*</u>

Item	Description	Settings (Default in bold)
Position Source	Chooses source of position data.	**FURUNO BB GPS:** GPS Receiver GP-320B/330B or Weather sensor WS-200 GP: GPS navigator (via NETWORK or NMEA port) LC: Loran C navigator (via NETWORK or NMEA port) ALL: Multiple navaid connection (via NETWORK or NMEA port)
Speed Source	Chooses source of speed data	**ETR** (NavNet sounder), NMEA
Temperature Source	Chooses source of water temperature data.	**ETR**, NMEA. Select ETR to show water temperature data fed from the network sounder.
Depth Source	Chooses source of depth data.	**ETR**, NMEA. Select ETR to show depth data fed from the network sounder.
STW Calibration	Calibrates NMEA speed data. Enter amount in percentage.	-50 to +50%, **00**
Temp Calibration	Calibrates NMEA temperature data. Enter offset to correct NMEA temperature data.	-20.0°C to +20.0°C (or equivalent in °F), **00.0°C**
Depth Calibration	Calibrates NMEA depth data. Enter offset to correct NMEA depth data.	-15 to +90 ft (or equivalent in m, fa or P/B). **00 ft**
Wind Averaging	Enter a value to smooth wind speed/direction data. Ship's bow is referenced to smooth wind vector movement.	001-600 s, **001 s**
Wind Direction Offset	Offsets wind direction data.	S180°-P180°, **S000.0°**
Wind Speed Calibration	Offsets NMEA wind speed data. Enter amount in percentage.	-50 to +50%, **00%**
Wind (MWV) Source	Chooses source of wind data.	**FURUNO BB GPS**, NMEA: Select FURUNO BB GPS to show wind data fed from the WS-200.
Air Temperature Source	Chooses source of air temperature data.	**FURUNO BB GPS**, NMEA: Select FURUNO BB GPS to show air temperature data fed from the WS-200.
Air Pressure Source	Chooses source of air pressure data.	**FURUNO BB GPS**, NMEA: Select FURUNO BB GPS to show air pressure data fed from the WS-200

36. After setting up, press the NEXT soft key, and the GPS SETUP menu appears. This menu setups the built-in GPS receiver.

37. Choose an item and press the EDIT soft key to show corresponding window.
38. Choose setting and then press the ENTER soft key. Refer to the table which follows for description.

►GEODETIC DATUM	WGS-84
POSITION SMOOTHING	000 second (s)
SPD/CSE SMOOTHING	005 second (s)
LATITUDE OFFSET	0.000'N
LONGITUDE OFFSET	0.000'E
DISABLE SATELLITE	- - -- - -
LATITUDE	45°35.000'N
LONGITUDE	125°00.000'W
ANTENNA HEIGHT	005 m
GPS FIX MODE	2D/3D
COLD START	NO

Installation wizard, GPS setup

GPS SETUP menu description

Item	Description	Settings	Default Setting
Geodetic Datum	Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing.	Use the trackball or **ENTER** knob to select appropriate chart.	WGS-84
Position Smoothing	When the DOP or receiving condition is unfavorable, the GPS fix may change, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting shows response time to change in latitude and longitude. This is especially noticeable at high ship' speeds. Increase the setting if the GPS fix changes.	0-999 sec	0 sec (no position smoothing)
Spd/Cse Smoothing	During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeros.	0-999 sec	5 sec
Latitude Offset	Offsets latitude position to further refine position accuracy. Use the N <- - > S soft key to switch coordinate.	9.999'S – 9.999'N	0.0' (no offset)
Longitude Offset	As above but for longitude. Use the W < - - > E soft key to switch coordinate.	9.999'E – 9.999'W	0.0' (no offset)

Item	**Description**	**Settings**	**Default Setting**
Disable Satellite	Every GPS satellite is broadcasting abnormal satellite number (s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key.		None
Latitude	Set initial latitude position after cold start. Use the N < - -> S soft key to switch coordinate.	90°S - 90°N	45°35.000'N
Longitude	Set initial longitude position after cold start. Use the W <- - > E soft key to switch coordinate.	180°E – 180°W	125°00.000W
Antenna Height	Enter the height of the GPS antenna unit above sea surface.	0-99 m	5 m
Fix Mode	Choose position fixing method: 2D (three satellites in view), 2D/3D (three or four satellites in view whichever is greater).	2D, 2D/3D	2D/3D
Cold Start	Clears the Almanac to receive the latest Almanac.	No, Yes	No

WAAS setup (requires GPS receiver GP-320B/330B)

Press the WAAS SETUP soft key to show the WAAS SETUP display.

Contents of WAAS SETUP menu

Item	Description	Settings	Default Setting
WAAS Mode	Select ON to use the WAAS mode.	On, Off	Off
WAAS Search	WAAS satellite can be searched automatically or manually. For manual search, enter appropriate WAAS satellite number.	Auto, Manual	Auto
WAAS Alarm	When the WAAS signal is lost, the audible alarm sounds with the visual message "NO WAAS SIGNAL." **On:** Alarm continues to sound until the WAAS positioning mode is available again or the alarm is recognized by key operation. **Off:** Alarm sounds three times.	On, Off	Off
Corrections Data	Selects the type of message for WAAS correction. Use "00" (operational status) in North America; "02" in other locations.	00 to 27, 99	02

39. After you have finished setting up the GPS receiver, it's now time to set up external equipment. Press the NEXT soft key to show the DATA1 (GPS/NMEA) port setup menu. It is only necessary to set up ports which you are going to use; skip unnecessary steps. **If you do not have external equipment connected to the NavNet, press the NEXT key several times to show the "FINISH AND EXIT INSTALLATION WIZARD" screen and then push the ENTER knob to finish.**

► OUTPUT FORMAT	NMEA0183 Ver 2.0
LAT/LON FORMAT	DD'MM.MMM'
XTE FORMAT	X. XX
OUTPUT DESTINATION	NO

Installation wizard, DATA1 (GPS/NMEA) port setup menu

40. Choose item and press the EDIT soft key. Choose appropriate setting and then press the ENTER soft key. Refer to the table and sentence description on the next page for details.
41. Press the NEXT key, and the DATA2 (NMEA) port setup menu appears. Set up this port similar to how you set up the DATA1 port.

► OUTPUT FORMAT	NMEA0183 Ver 2.0
BAUD RATE	4800bps
LAT/LON FORMAT	DD'MM.MMM'
XTE FORMAT	X. XX
OUTPUT DESTINATION	NO

Installation wizard, DATA2 (NMEA) port setup menu

42. Press the NEXT key, and the DATA4 (PC/NMEA/EXT. BUZZ) port setup menu appears. Set up this port similar to how you set up the DATA2 port.

```
► NMEA OUTPUT FORMAT    NMEA VER. 2.0
  BAUD RATE             4800 bps
  BIT LENGTH            8 bits
  STOP BIT              1 bit
  (CONTROL: Xon/Xoff)
```

Installation wizard, DATA4 (PC/NMEA/EXT. BUZZ) port setup menu

Description of items in "port" menus

Item	Description	Settings	Default Setting
Output Format	Selects NMEA output version for the equipment connected.	NMEA0183 Ver. 1.5, NMEA0183 Ver. 2.0	NMEA0183 Ver. 2.0
Baud Rate	Sets baud rate.	**DATA2 port:** AUTO*[1], 4800, 38400*[2] (bps) **DATA4 port**: 4800, 9600, 19200 (bps)	4800 bps
Lat/Lon Format	Selects latitude/longitude format to output.	DD°MM.MM', DD°MM.MMM', DD°MM.MMMM'	DD°MM.MMM'
XTE Format	Selects number of XTE digits to output.	X. XX, X. XXX	X. XX
Output Destination	Selects whether to output route (data sentence RTE) and waypoint data (data sentence WPL) when destination is set.	Yes, No	No
PORT MNITR (soft key)	Use this key to view which sentences are being output. See the example below.		

*[1] Auto detection of baud rate of connected equipment. For use only with device having "AUTO" feature.

*[2] Choose 38400 bps when connecting an AIS Interface or AIS Transponder to the DATA2 port.

```
$GPGLL,3415.2345,N,13520.5301,E,152500.00
,A*E7<CR><LF>$GPGLL,3415.2345,N,135
20.5301,E,152500.00,A*E7<CR><LF>$GPGLL
,3415.2345,N,13520.5301,E,152500.00,A*
E7<CR><LF>$GPGLL,3415.2345,N,13520.530
1,E,152500.00,A*E7<CR><LF>$GPGLL,3415.
2345,N,13520.5301,E,152500.00,A*E7<CR>
<LF>$GPGLL,3415.2345,N,13520.5301,E,15
2500.00,A*E7<CR><LF
```

Installation wizard, port monitor display

43. Press the NEXT soft key, and the NMEA sentence selection window (for network) appears.

►	AAM	--
	APB	--
	BOD	--
	BWR	--
	DPT	--
	GGA	--
	GLL	--
	GTD	--
	MTW	--
	RMA	--
	RMB	--
	RMC	--
	VHW	--
	VTG	--
	WPL	--
	XTE	--
	ZDA	--
	HDT	--
	HDG	--
	MWV	--
	ZTG	--

Installation wizard, NMEA sentence selection window

44. Choose sentence to process and press the ON/OFF soft key to show ON or “- -“ (OFF) as appropriate.
45. Press the NEXT soft key and the message “FINISH AND EXIT INSTALLATION WIZARD. ARE YOU SURE?” appears. Press the **ENTER** knob to finish the installation wizard.

This concludes the Installation Wizard. Turn off the equipment to register settings.

3.2 Checking Magnetron Heater Voltage

Magnetron heater voltage is formed on the MD (1824C), PTU (1834C) or RTB (1934C/1944C1954C/1964C) Board of the antenna unit, and preadjusted at the factory. Therefore, no adjustment is required. However, check magnetron heater voltage for confirmation as shown below. ***This procedure should only be performed by a qualified technician.***

1. Open the antenna unit.
2. Turn on the power. Do not transmit the radar.
3. Connect a multimeter, set to 10VDC range, appropriate position on the MD (1824C), PTU (1834C) or RTB (1934C/1944C1954C/1964C) Board in the antenna unit. Refer to the table in below.
4. Confirm that the multimeter indication is within the ratings shown below.

	MODEL1824C	**MODEL1834C**	**MODEL1934C/1944C/ 1954C/1964C**
Check point	TP804#6 (+) and #4 (-) on MD Board	TP802#4 (+) and #6 (-) on PTU Board	J825#4 and #6 (GND) on RTB Board
Multimeter indication	7.9 to 8.1 V	7.4 to 7.6 V	7.4 to 7.6 V
Adjustment point	VR801 on MD Board	R106 on PTU Board	VR801 on MD Board

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4. OPTIONAL EQUIPMENT

4.1 ARP Kit ARP-11

Necessary parts

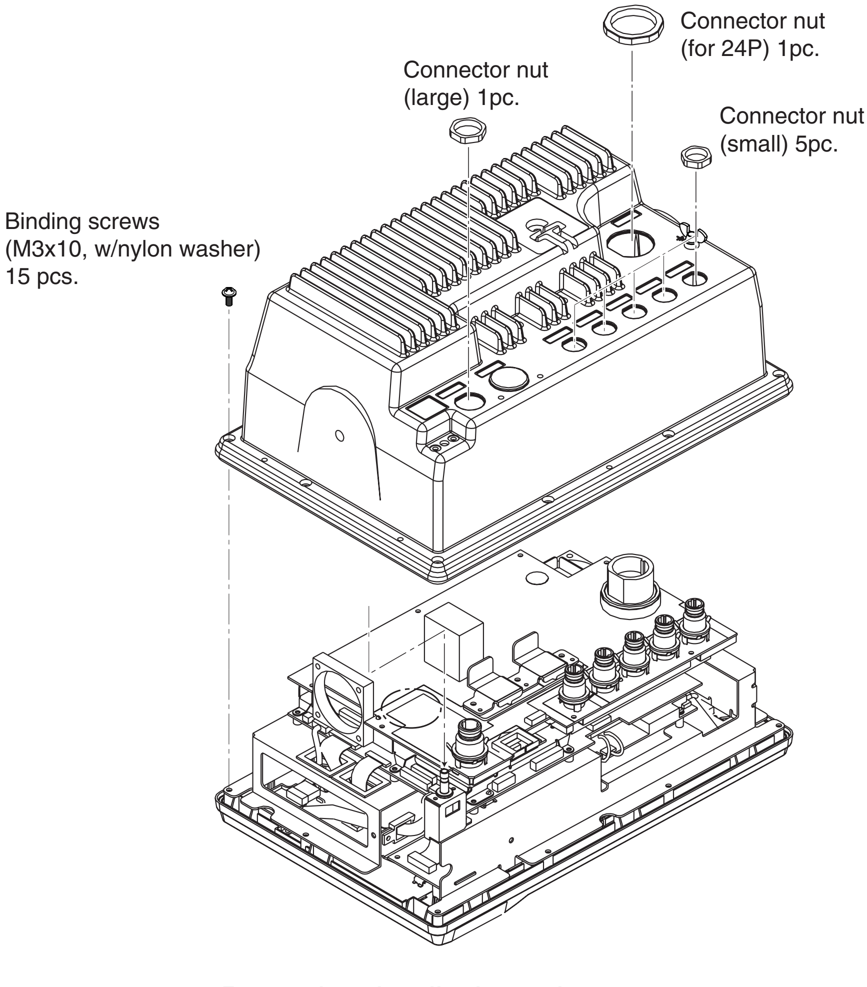
Name: ARP kit
Type: ARP-11
Code no.: 008-523-050

Contents of ARP kit

Name	Type	Code No.	Qty
ARP Board	18P9014B	001-068-900	1
Pan head screw	M3x6 C2700W	000-163-189-10	4
Spacer*	SQ-9	000-159-320-10	1
	SQ-15	000-159-299-10	3
Spring washer*	M3 C5191W	000-168-187-10	3

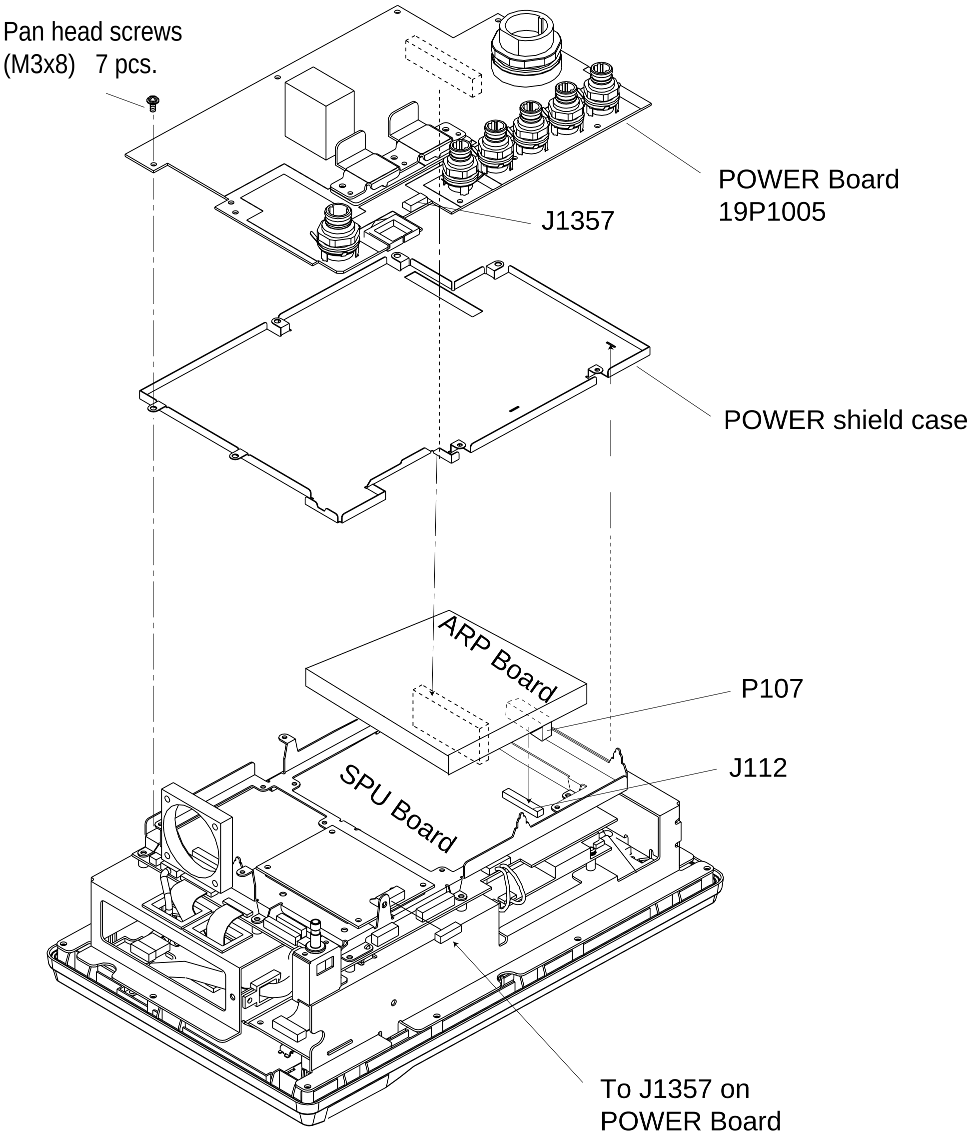
*Not used

1. Unscrew seven connecter nuts at the rear of the display unit.
2. Unfasten 15 binding screws (M3x10) to remove the display cover.



Removing the display unit cover

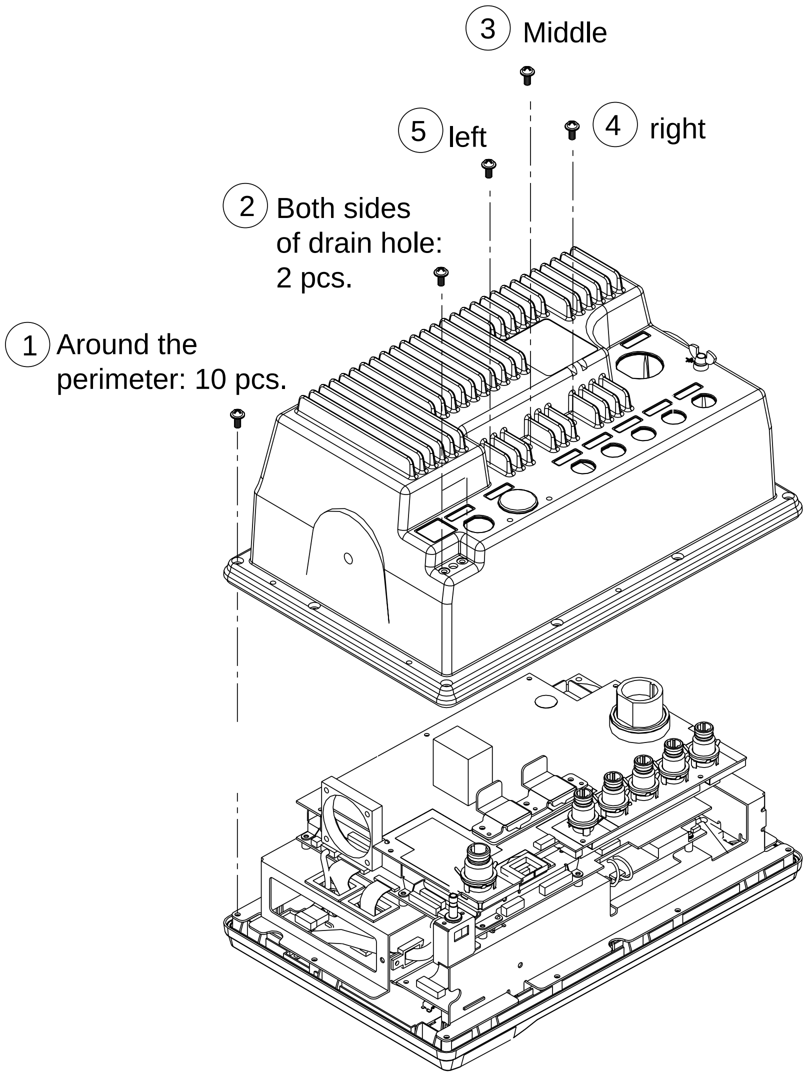
3. Disconnect the PH5P connector from J1357 on the POWER Board (19P1005).
4. Unfasten seven pan head screws (M3x8) to dismount the POWER Board and POWER shield case from the display unit.



Dismounting the POWER Board

5. Mate P107 on the ARP Board (option) to J112 on the SPU Board.
6. Fix the ARP Board on the SPU Board with four pan head screws and spring washers (supplied with option kit).
7. Remount the POWER Board and power shield case with pan head screws (M3x8, 7pcs.)
8. Attach the PH5P connector to J1357 on the POWER Board.

9. Fasten screws in order shown below to mount the display cover.



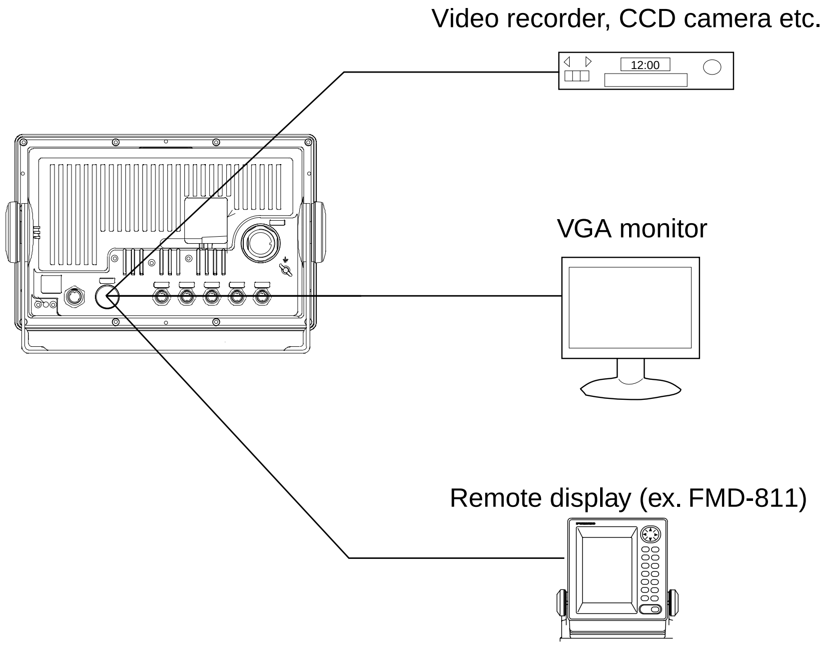
③ ④ ⑤ screws: The torque should be 0.54 ± 0.05 N·m.

Order of fastening screws

10. Fasten seven connector nuts.

4.2 Connection of Video Equipment/ External Monitor/Remote Display

The above units can be connected to the MODEL1824C/1834C/1934C/1944C/1954C and GD-1920C by using the hole at the rear of the display unit. Remove the cover to use this hole. After connecting, cover the hole with soft putty to seal.



> **⚠ CAUTION**
>
> Even though the display unit meets waterproof standard IPX-5, this modification can affect waterproofness. Watertight integrity cannot be guaranteed.

Connection of Video equipment/External monitor/remote display

4.2.1 Connecting video equipment

The display unit can show the picture from a CCD camera, video recorder, etc. which outputs composite signal in NTSC/PAL format, by using the optional NTSC/PAL interface kit.

Necessary parts

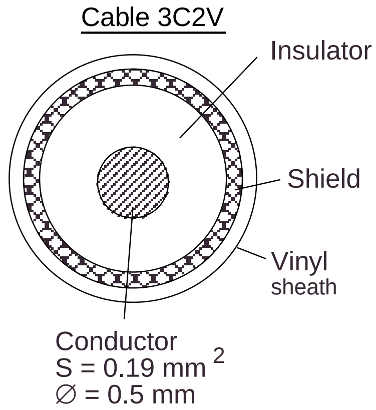
Name: NTSC/PAL Interface kit
Type: OP03-175
Code no.: 008-523-070

Contents of NTSC/PAL Interface kit

Name	Type	Code No.	Qty	Remarks
PIP board	19P1004	008-521-890	1	NTSC/PAL interface Board
Pan head screw	M3x6 C2700W	000-881-403	4	
Connector assy	RCA-TMP-L230	000-144-615	1	
Cable tie	SG-130	000-809-171	3	w/foot for fixing
Rubber grommet	MG-4	000-871-378	1	

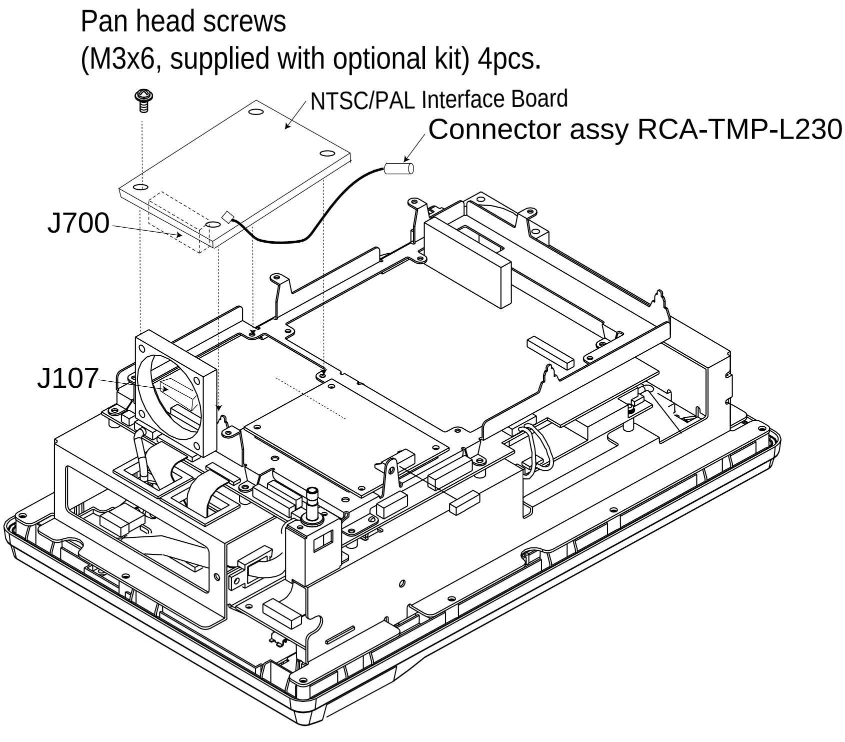
For connection with the CCD camera/video recorder, the following cable is necessary (local supply).

- Connector at both ends: RCA connector (metal)
- Cable length: shorter than 10 m
- 2.5C2V or 3C2V (Japan Industrial Standard (JIS), or the equivalent) coaxial cable (Impedance: 75 Ω)



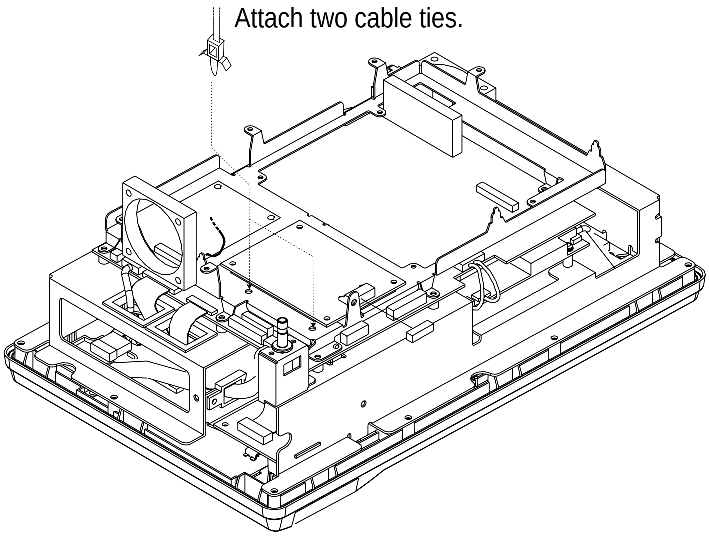
Cable 3C-2V, sectional view

1. Remove the display unit cover, POWER Board and power shield case referring to the step 1 through 4 inn "4.1 ARP kit ARP-11."
2. Attach the NTSC/PAL Interface Board to the SPU Board with four pan head screws (M3x6, supplied with optional kit) so that J700 connector on the NTSC/PAL Interface Board faces to J107 on the SPU Board.
3. Attach the connector assy RCA-TMP-L230 to J701 on the NTSC/PAL Interface Board.



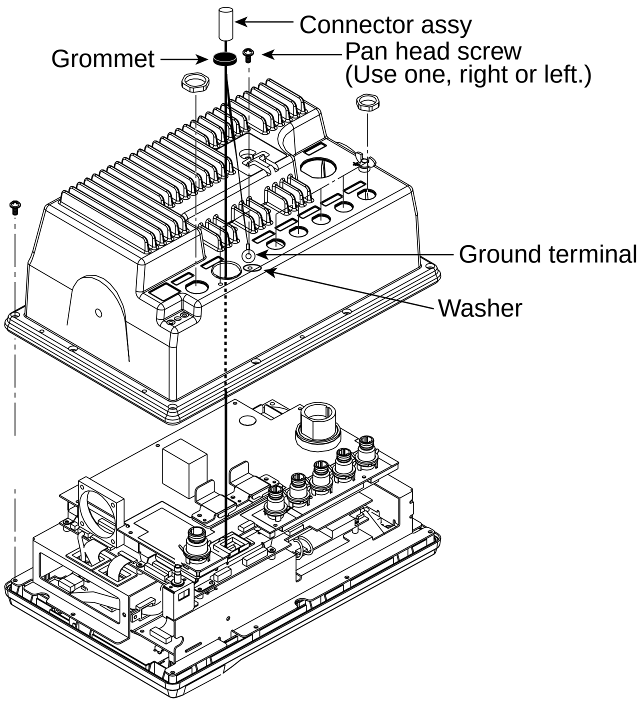
NTSC/PAL Interface Board attachment

4. Set two cable tie “legs” (supplied with option kit) as shown below.



Cable ties attachment.

5. Tie the connector assy with two cable ties attached at step 4.
6. Remount the POWER Board and power shield case with pan head screws (M3x8, 5 pcs.)
7. Attach the PH5P connector from SPU Board to J1357 on the POWER Board.
8. Pass the connector assy through the saddle on the POWER Board.
9. Remount the display unit cover referring to the illustration on page 4-3 so that the cable runs through the hole the connector cover removed.
10. Cut a “cross” in the grommet to pass the cable through it and then attach the grommet.



Display unit, passing the PIP cable

11. Fasten the ground wire of the connector assy with a pan head screw (M4x10) shown in the above. Finally, cover the hole with soft putty to seal.

4.2.2 Connecting an external monitor

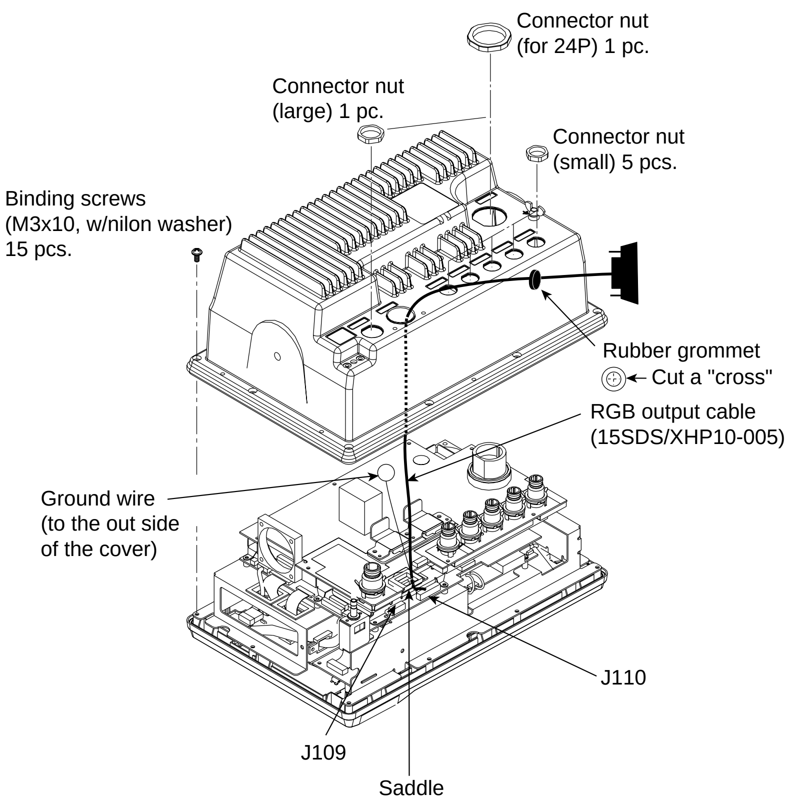
You can display the MODEL1824C/1834C/1934C/1944C/1954C screen on an external monitor which accepts industrial standard VGA input by using the optional RGB output cable kit OP03-176. Supply monitor and interconnection cable (with HD-15P connectors of male, three rows of 15 pins) locally.

Necessary parts for external monitor

Name: RGB output cable kit
Type: OP03-176
Code No.: 008-526-360

Name	Type	Code No.	Qty
Cable assy.	15SDS/XHP10-005	000-144-511	1
Grommet	MG-4	000-871-378	1

1. Unscrew 15 binding screws (M3x10, w/nylon washer) and seven connector nuts to remove the display unit cover.
2. Cut a “cross” in the grommet (to pass the cable).
3. Pass the RGB output cable through the grommet hole at the rear of the display unit cover and the saddle on the POWER Board, and then connect the XH connector (10P) of the RGB output cable to J110 on the SPU Board. Put the ground wire of the cable outside of the cover.
4. Reassemble the display unit referring to the illustration on page 4-3.
5. Fix the ground wire of the cable with one of two screws both sides of the connector hole.
6. Finally, cover the hole with soft putty to seal

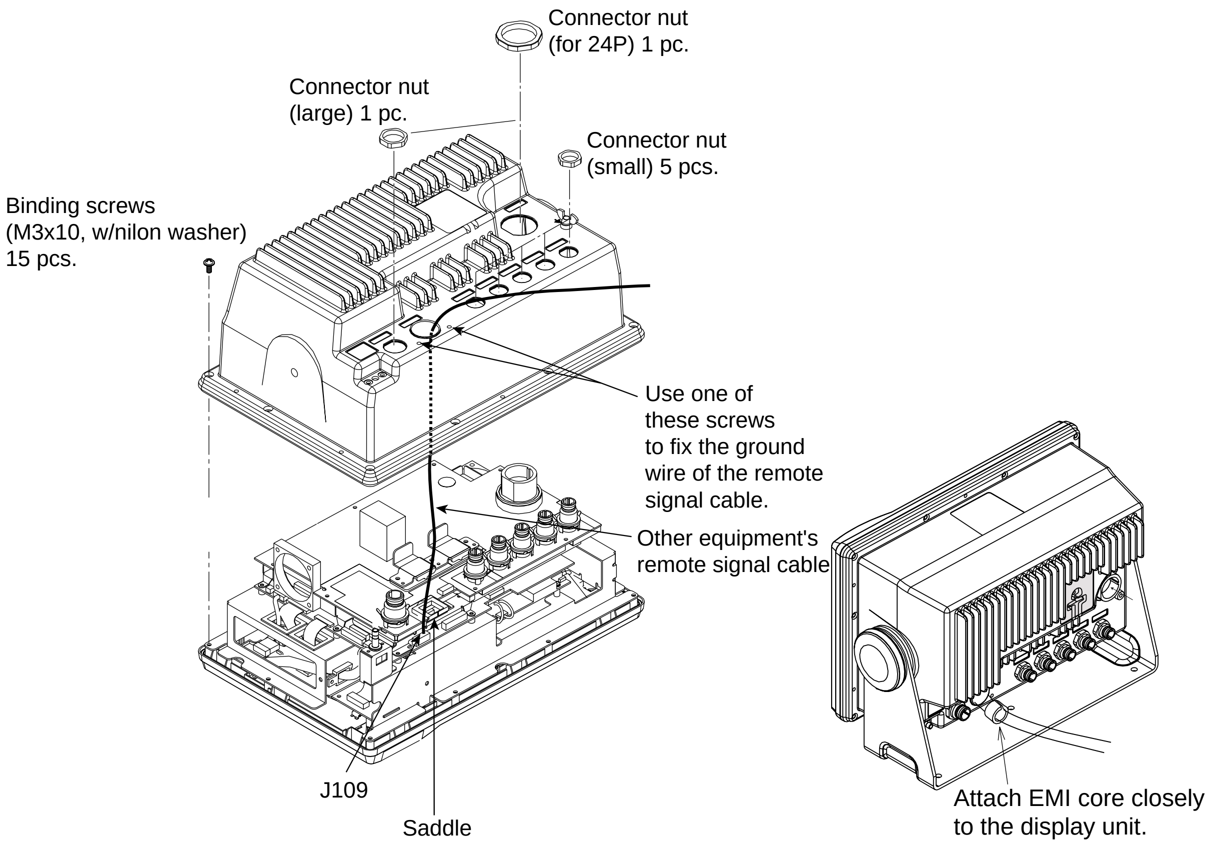


How to connect 15SDS/XHP10-005

4.2.3 Connecting remote display

The FURUNO Display unit FMD-811, MODEL1832 or GD-280/380, etc. can be connected to the NavNet display as remote display. To interconnect them, use a cable attached with or set as option for the remote display. For the network system consists of some units, connect the remote display cable to the one selected as radar source. Also, the optional EMI core (Type: E04R241336A, Code No.:000-146-335) should be attached to the remote display cable to prevent a noise.

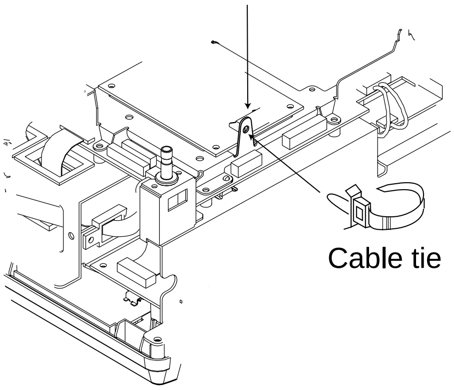
1. Unscrew 15 binding screws (M3x10, w/nylon washer) and seven connector nuts to remove the display unit cover.
2. Pass the signal cable for remote displaying through the hole at the rear of the display unit cover and the saddle on the POWER Board, and then connect the XH connector (8P) of the signal cable to J109 on the SPU Board. If your remote signal cable has the ground wire, pass it outside of the cover and fix it with the screw shown below.
3. Reassemble the display unit referring to the illustration on page 4-3.
4. Attach the EMI core (option) to the remote display cable as shown below.



How to connect remote signal cable

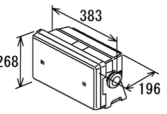
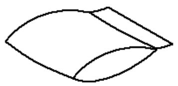
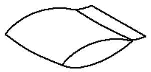
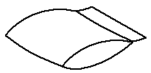
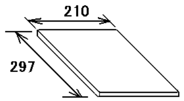
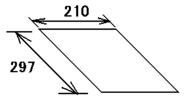
4.2.4 Attaching more than two units

When more than two cables of PIP kit, VGA monitor cable and remote signal cable, use the cable tie supplied as the installation materials with the display unit to tie optional cables. Attach the cable tie to the hole on the POWER Board.



Attaching the cable tie to POWER Board

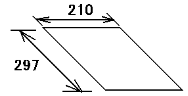
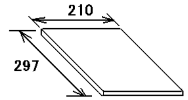
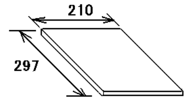
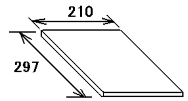
PACKING LIST RDP-149-E-N/C-CS、-N/C-ARP-CS

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
指示部 DISPLAY UNIT		RDP-149-E-N 000-088-127-00 **	1
ﾘﾓｺﾝｾｯﾄ REMOTE CONTROLLER SET			
ﾘﾓｺﾝｾｯﾄ REMOTE CONTROLLER SET		RMC-100-E 000-089-885-00	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14001 000-080-018-00	1
工事材料 INSTALLATION MATERIALS		CP03-22700	
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0018-050ZC 000-154-025-10	1
工事材料 INSTALLATION MATERIALS		CP03-22701 008-523-660-00	1
図書 DOCUMENT			
SIRIUS操作ﾏﾆｭｱﾙ SIRUS REFERENCE MANUAL		E32-00701-* 000-166-955-1*	1 (*1)
ﾌﾗｯｼｭﾏｳﾝﾄｶﾀｶﾞﾐ FLUSH MOUNTING TEMPLATE		C32-00511-* 000-160-391-1*	1

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

2.(*1)の図書は、C-MAP仕様のみ必要です。
(*1) C-MAP SPECIFICATION ONLY.

(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾋｭｰｽﾞ変更のお願い NOTIFICATION DOCUMENT		C32-00007-* 000-160-382-1*	1
取扱説明書(英) OPERATOR'S MANUAL(EN)		OME-35430-* 000-160-383-1*	1
操作要領書(英) OPERATOR'S GUIDE(EN)		OSE-35430-* 000-160-387-1*	1
装備要領書(英) INSTALLATION MANUAL(EN)		IME-35430-* 000-160-384-1*	1

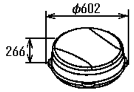
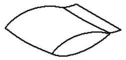
型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

PACKING LIST

19AL-X-9852 -5 1/1

RSB-0071-057/J

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		RSB-0071-057 000-086-830-00 **	1
空中線部工材 ANTENNA UNIT INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-16901 008-478-750-00	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

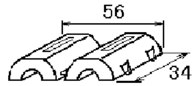
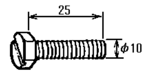
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TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

19AL-X-9852

PACKING LIST

19AO-X-9851 -1 1/1

RSB-0094-075

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線部 ANTENNA UNIT		RSB-0094-075 000-080-237-00	1
工事材料 INSTALLATION MATERIALS		**CP03-25401**	
EMIｺｱ EMI CORE		RFC-10 000-141-085-10	1
六角ﾎﾞﾙﾄ ｽﾘ割 HEX.BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308-00	4

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C3513-Z01-A

19AO-X-9851

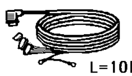
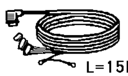
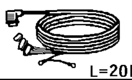
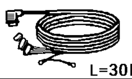
FURUNO

CODE NO.		19AL-X-9401 -1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

MODEL1824C/1834C

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0002-100 CODE NO. 000-138-972-00	1	選択 TO BE SELECTED
2	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0002-150 CODE NO. 000-138-970-00	1	選択 TO BE SELECTED
3	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0002-200 CODE NO. 000-138-974-00	1	選択 TO BE SELECTED
4	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0002-300 CODE NO. 000-138-973-00	1	選択 TO BE SELECTED

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

19AL-X-9401

FURUNO ELECTRIC CO ., LTD.

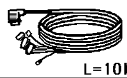
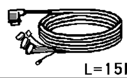
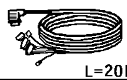
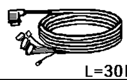
FURUNO

CODE NO.		19AL-X-9402 -2
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

MODEL1934C/1944C/1954C

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0005-100 CODE NO. 000-140-434-00	1	選択 TO BE SELECTED
2	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0005-150 CODE NO. 000-140-435-00	1	選択 TO BE SELECTED
3	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0005-200 CODE NO. 000-140-436-00	1	選択 TO BE SELECTED
4	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0005-300 CODE NO. 000-140-437-00	1	選択 TO BE SELECTED

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

19AL-X-9402

FURUNO ELECTRIC CO ., LTD.

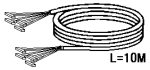
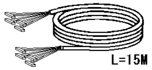
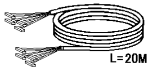
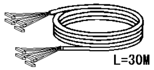
FURUNO

CODE NO.		19AV-X-9402 -0
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

MODEL1964C

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=10M	RW-9771 *10M* CODE NO. 000-152-866-10	1	選択 TO BE SELECTED
2	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=15M	RW-9771 *15M* CODE NO. 000-152-867-10	1	選択 TO BE SELECTED
3	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=20M	RW-9771 *20M* CODE NO. 000-152-868-10	1	選択 TO BE SELECTED
4	ｹｰﾌﾞﾙ組品 CABLE ASSY.	 L=30M	RW-9771 *30M* CODE NO. 000-152-869-10	1	選択 TO BE SELECTED

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

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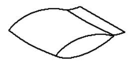
19AV-X-9402

FURUNO ELECTRIC CO ., LTD.

PACKING LIST

19AK-X-9856 -7 1/1

XN10A, XN12A, XN13A, XN12A-N-CKD, XN13A-N-CKD

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ｱﾝﾃﾅ ANTENNA	 L L=1036(XN10A), 1255(XN12A), 1795(XN13A)	XN10A/12A/13A 008-390-960-00 **	1
ｱﾝﾃﾅ工材 ANTENNA INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-22901 008-523-690-00	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
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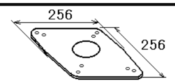
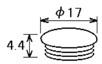
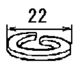
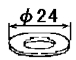
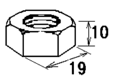
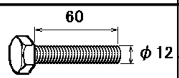
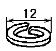
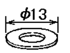
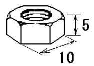
19AK-X-9856

FURUNO

CODE NO.	008-503-360-00	03FR-X-9401 -14
TYPE	CP03-18401	1/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名　称 NAME	略　図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｼｰﾙﾜｯｼｬｰ SEAL WASHER		03-001-3002-0 ROHS CODE NO. 300-130-020-10	4	
2	防蝕ゴム CORROSION-PROOF RUBBER MAT		03-142-3001-0 ROHS CODE NO. 100-275-580-10	1	
3	ｷｬｯﾌﾟ KNOB CAP		040-4010 CODE NO. 000-164-929-10	4	
4	ﾊﾞﾈ座金 SPRING WASHER		M12 SUS304 CODE NO. 000-167-397-10	4	
5	ﾐｶﾞｷﾏﾙ平座金 FLAT WASHER		M12 SUS304 CODE NO. 000-167-446-10	4	
6	六角ﾅｯﾄ 1ｼｭ HEXAGONAL NUT		M12 SUS304 CODE NO. 000-167-491-10	4	
7	六角ﾎﾞﾙﾄ（全ﾈｼﾞ） HEXAGON HEAD SCREW		M12X60 SUS304 CODE NO. 000-162-813-10	4	
8	ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-158-855-10	1	
9	ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-158-854-10	3	
10	六角ﾅｯﾄ 1ｼｭ HEXAGONAL NUT		M6 SUS304 CODE NO. 000-158-856-10	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

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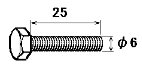
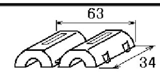
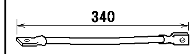
FURUNO ELECTRIC CO ., LTD.　　03FR-X-9401

FURUNO

CODE NO.	008-503-360-00	03FR-X-9401 -14
TYPE	CP03-18401	2/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名　称 NAME	略　図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
11	六角ﾎﾞﾙﾄ HEXAGONAL HEAD BOLT		M6X25 SUS304 CODE NO. 000-162-871-10	1	
12	EMIｺｱ EMI CORE		RFC-13 CODE NO. 000-141-084-11	3	
13	ｹｰﾌﾞﾙ組品 CABLE ASSY.		RW-4747 RW-4747-1 CODE NO. 000-566-000-12 000-566-000-01	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

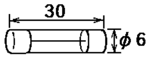
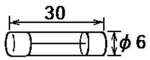
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FURUNO ELECTRIC CO ., LTD.　　03FR-X-9401

FURUNO

CODE NO.	000-080-018-00	19AM-X-9301 -2 1/1
TYPE	SP03-14001	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE GLASS TUBE TYPE		FGBO 125V 7A PBF			3	000-155-831-10
2	ﾋｭｰｽﾞ FUSE GLASS TUBE TYPE		FGBO 125V 15A PBF			3	000-155-827-10

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	19AM-X-9301	1/1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

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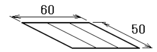
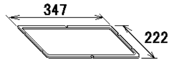
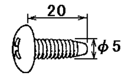
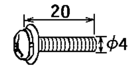
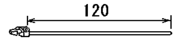
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FURUNO

CODE NO.	008-523-660-00	19AM-X-9402 -4
TYPE	CP03-22701	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾋｭｰｽﾞﾊﾘﾏｰｸ FUSE LABEL		03-153-1312-0 CODE NO. 100-292-140-10	1	
2	Fﾏｳﾝﾄﾖｳｽﾎﾟﾝｼﾞ FLUSH MOUNTING SPONGE		19-022-1521-0 CODE NO. 100-323-900-00	1	
3	+ﾄﾗｽﾀｯﾋﾟﾝｸﾞﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
4	+ﾅﾍﾞ ｾﾑｽB WASHER HEAD SCREW *B*		M4X20 SUS304 CODE NO. 000-162-652-10	6	
5	ｽﾅｯﾌﾟﾊﾞﾝﾄﾞ CABLE TIE		SG-130 CODE NO. 000-809-171-10	1	

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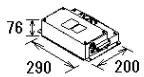
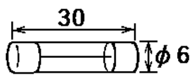
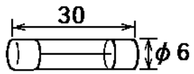
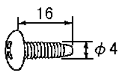
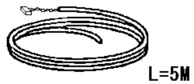
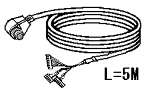
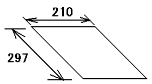
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FURUNO ELECTRIC CO., LTD.

19AM-X-9402

PACKING LIST

PSU-005

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線電源部 POWER SUPPLY UNIT		PSU-005 000-080-190-00	1
予備品 SPARE PARTS		SP03-14001	
ﾋｭｰｽﾞ GLASS TUBE FUSE		FGBO 125V 15A PBF 000-155-827-10	3
ﾋｭｰｽﾞ GLASS TUBE FUSE		FGBO 125V 7A PBF 000-155-831-10	3
工事材料 INSTALLATION MATERIALS		CP03-24501	
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		4X16 SUS304 000-162-605-10	4
工事材料 INSTALLATION MATERIALS			
ｹｰﾌﾞﾙｸﾐﾋﾝ CABLE ASSEMBLY		VL3P-VV-S2X2C-AA050 000-152-217-11	1
ｹｰﾌﾞﾙ組品MJ SIGNAL CABLE ASSEMBLY		MJ-B24LPF0009-050+R 000-158-092-12	1
図書 DOCUMENT			
ﾋｭｰｽﾞ変更のお願い NOTIFICATION DOCUMEN		C32-00201-* 000-809-319-1*	1

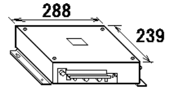
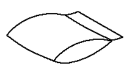
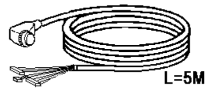
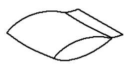
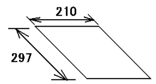
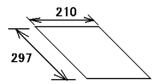
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PACKING LIST

PSU-008

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線電源部 POWER SUPPLY UNIT		PSU-008 000-083-617-00	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14501 008-444-420-00	1
工事材料 INSTALLATION MATERIALS		CP03-30600	
ｹｰﾌﾞﾙｸﾐﾋﾝ CABLE ASSEMBLY		VL3P-VV-S2X2C-AA050 000-152-217-11	1
ｹｰﾌﾞﾙ組品MJ SIGNAL CABLE ASSEMBLY		MJ-B24LPF0011-050+R 000-152-939-12	1
工事材料 INSTALLATION MATERIALS		CP03-30601 008-550-740-00	1
図書 DOCUMENT			
ﾋｭｰｽﾞ変更のお願い NOTIFICATION DOCUMENT		C32-00502-* 000-152-940-1*	1
設定要領書 INTERNAL SETTING(JR/EN)		C32-00505-* 000-153-867-1*	1

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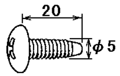
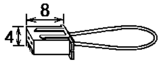
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-550-740-00	19AV-X-9401 -2
TYPE	CP03-30601	1/1

工事材料表

INSTALLATION MATERIALS

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
2	コネクタ組品 CONNECTOR ASSY.		XH2P-L40-ACR CODE NO. 000-153-879-10	1	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

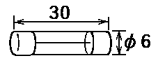
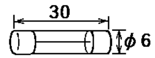
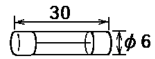
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO ., LTD.　　19AV-X-9401

FURUNO

CODE NO.	008-444-420	19AQ-X-9301 -2 1/1
TYPE	SP03-14501	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE		FGBO 125V 15A PBF FGBO 15A AC125V			3	000-155-827-10 000-549-014-00
2	ヒューズ FUSE		FGBO 125V 7A PBF FGBO 7A AC125V			3	000-155-831-10 000-549-013-00
3	カンイリヒューズ FUSE		FGBO 125V 3A PBF FGBO 3A AC125V			3	000-155-830-10 000-131-845-00

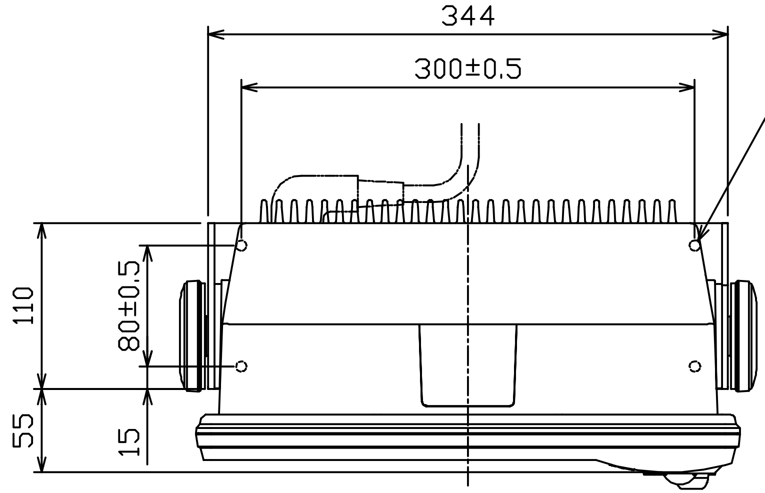
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	19AQ-X-9301	1/1

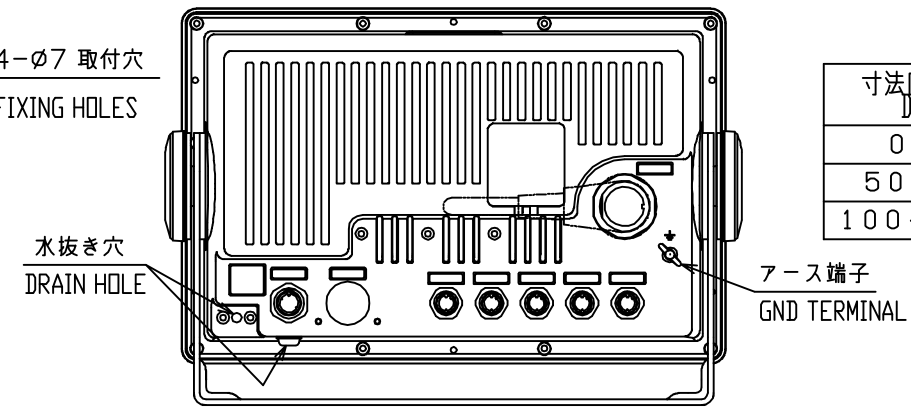
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

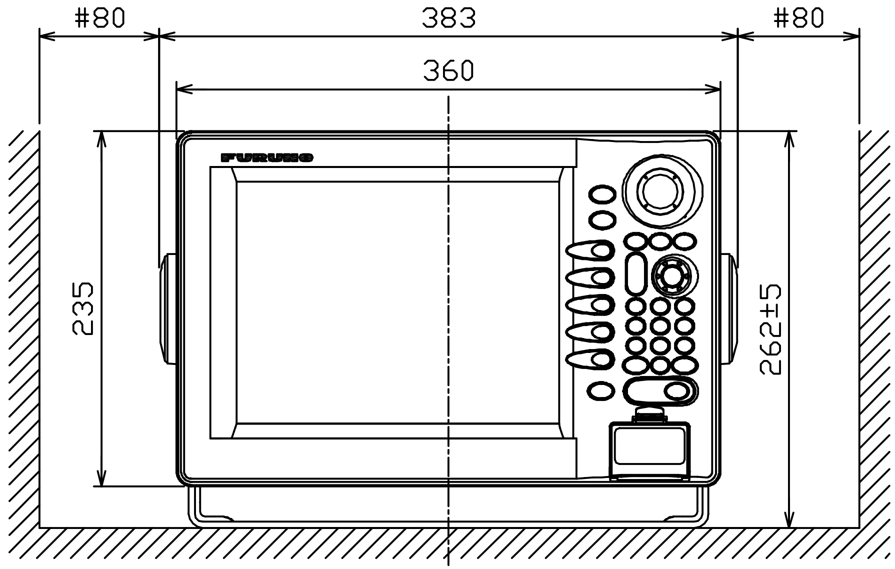




矢視 A VIEW A

表1 TABLE 1

寸法区分（ｍｍ）DIMENSIONS	公差（ｍｍ）TOLERANCE
０＜Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３



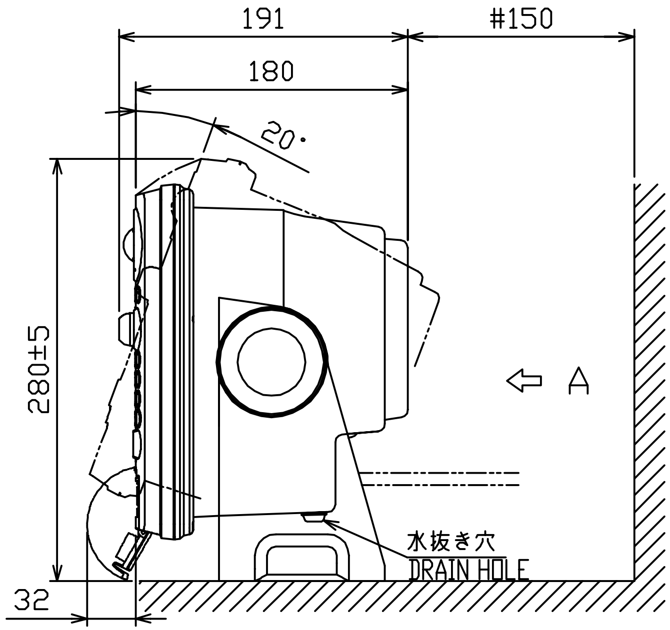


表2 TABLE 2

ユニット型式 TYPE	質量 MASS
RDP-138/151	5.8kg±10%
RDP-139	6.5kg±10%
RDP-149	6.8kg±10%

注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジは＋トラスタッピンネジ呼び径５×２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN	Dec. 8, '04 E. MIYOSHI	MODEL 1934C/1944C/1954C MODEL 1824C/1834C	TITLE RDP-138/139/149/151
CHECKED	TAKAHASHI. T	MODEL 1933CR GD-1900C/GD-1920C	名称 指示部（卓上装備）
APPROVED	Y. Hatai	MODEL 1933C/1943C MODEL 1833C	外寸図
SCALE 1/5	MASS TABLE 2 表２参照		NAME DISPLAY UNIT (TABLETOP MOUNT)
DWG.No. C3503-G01- E	19-022-100G- 5		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

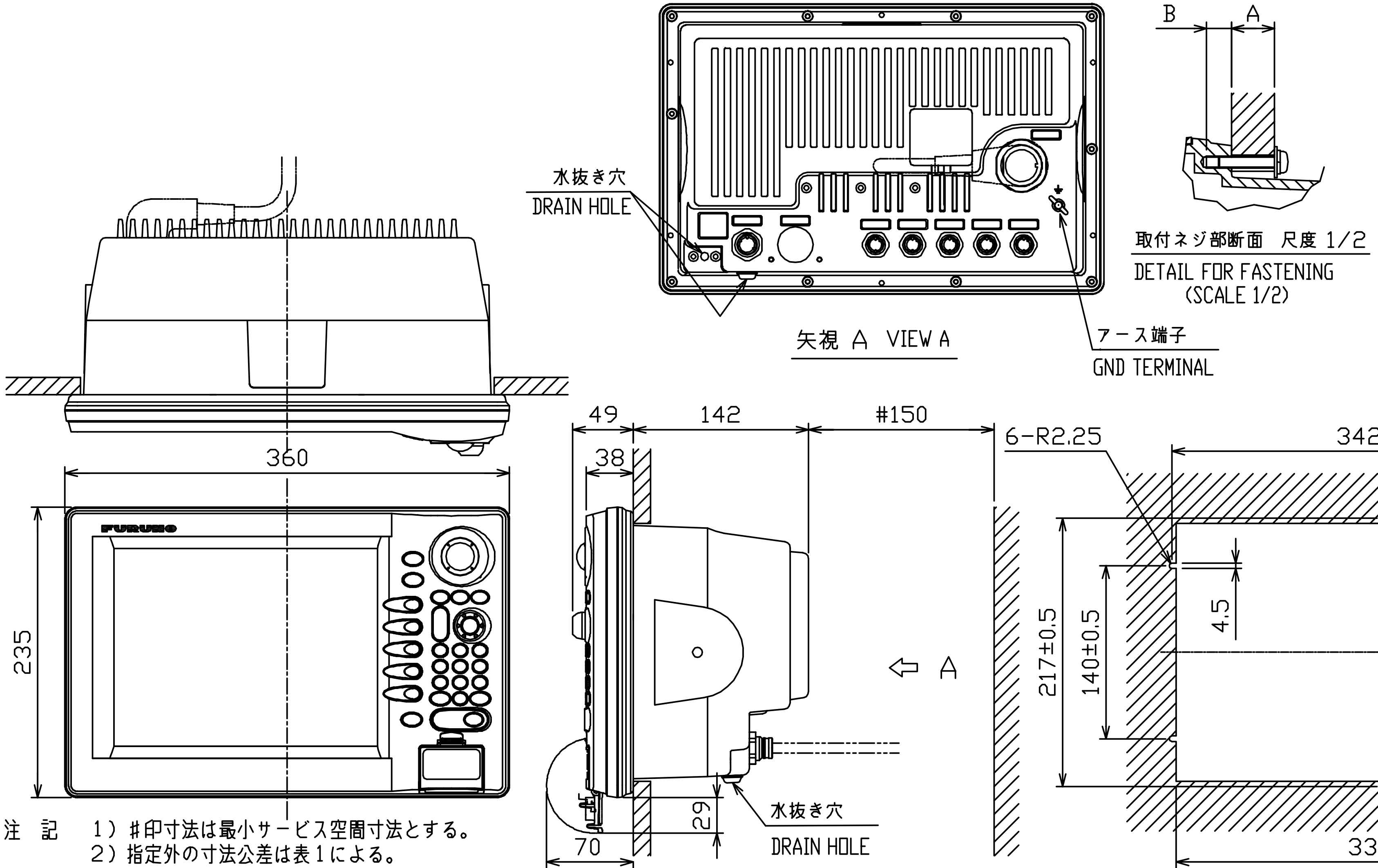


表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0＜L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

表2 TABLE 2

ユニット型式 TYPE	質量 MASS
RDP-138/151	4.9kg±10%
RDP-139	5.6kg±10%
RDP-149	5.9kg±10%

注 記

1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表1による。
3）取付用ネジは、セムスネジB M4×20を使用のこと。
壁の厚さ（A）は11≦A≦14とする。それ以外の壁に装備する場合
使用するネジの長さは(A+7.8)±2とする。（セムスネジBを使用）
きょう体にはネジ部を8mm以上入れないこと。（B≦8）

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4x20 SCREWS FOR FIXING THE UNIT.
THICKNESS A: 11≦A≦14 OR SCREW LENGTH: (A+7.8)±2.
DO NOT FASTEN SCREWS INTO UNIT MORE THAN 8 mm (B≦8).

DRAWN	Jan. 12, '05 E. MIYOSHI	MODEL 1934C/1944C/1954C MODEL 1824C/1834C	TITLE	RDP-138/139/149/151
CHECKED	TAKAHASHI. T	MODEL 1933CR GD-1900C/1920C	名称	指示部（埋込装備）
APPROVED	Y. Hatai	MODEL 1933C/1943C MODEL 1833C		外寸図
SCALE	1/5 MASS TABLE 2 表2参照		NAME	DISPLAY UNIT (FLUSH MOUNT)
DWG.No.	C3503-G02- E	19-022-110G- 4		OUTLINE DRAWING

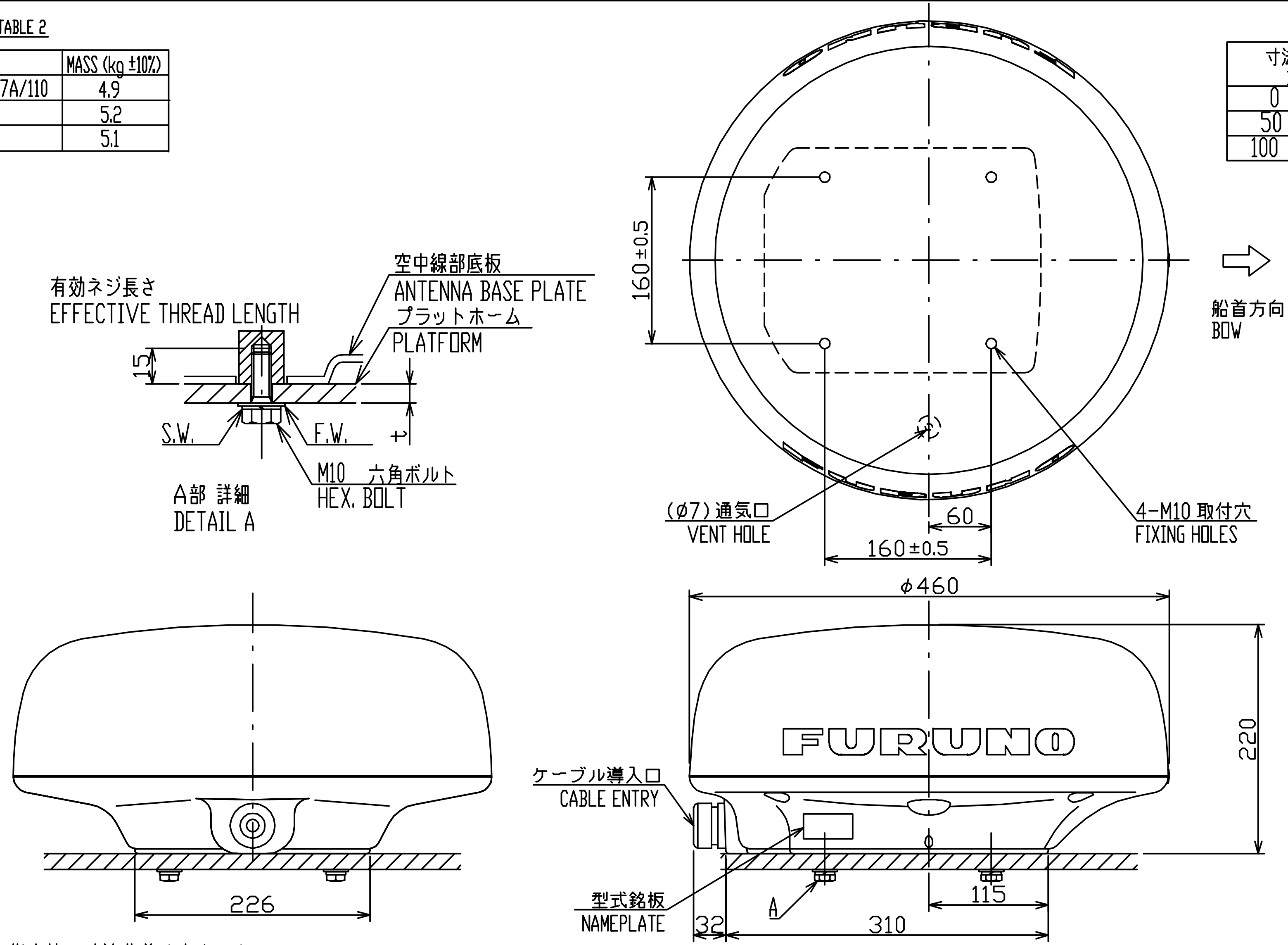
FURUNO ELECTRIC CO., LTD.

表2 TABLE 2

MODEL	MASS (kg ±10%)
RSB-0087/0087A/110	4.9
RSB-0094	5.2
RSB-0095	5.1

表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3



注記 1） 指定外の寸法公差は表1による。
2） 取付はM10ボルトを使用のこと。
ネジ長さは板厚tに応じて、20 (t≦5)または25 (5<t≦10)とする。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M10 BOLTS FOR FIXING UNIT.
SCREW LENGTH SHALL BE ACCORDING TO PLATFORM THICKNESS:
20 (t≦5) OR 25 (5<t≦10).

DRAWN	Jan. 12, '05 E. MIYOSHI	MODEL 1724C MODEL 1824C/1824C-BB	TITLE	RSB-0087/0087A/0094/0095/110
CHECKED	TAKAHASHI.T	MODEL 1715 MODEL 1823C	名称	空中線部
APPROVED	Y. Hatai	MODEL 1722/1722C/1723C MODEL 1712		外寸図
SCALE	1/6 MASS TABLE 2 表2 kg		NAME	ANTENNA UNIT
DWG.No.	C3489-G02- H	03-161-100G-3/03-164-300G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

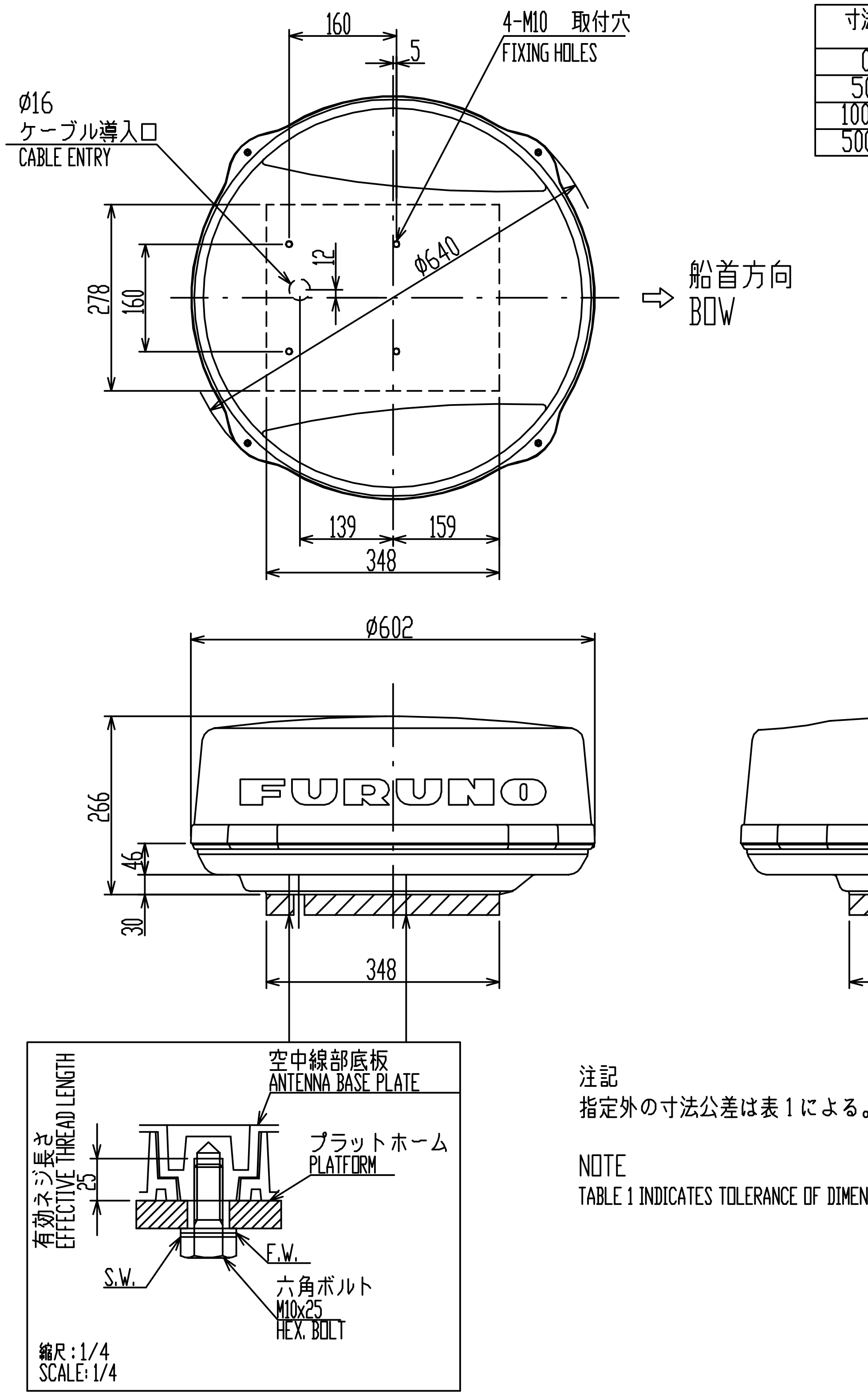


表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3
500 < L ≦ 1000	±4

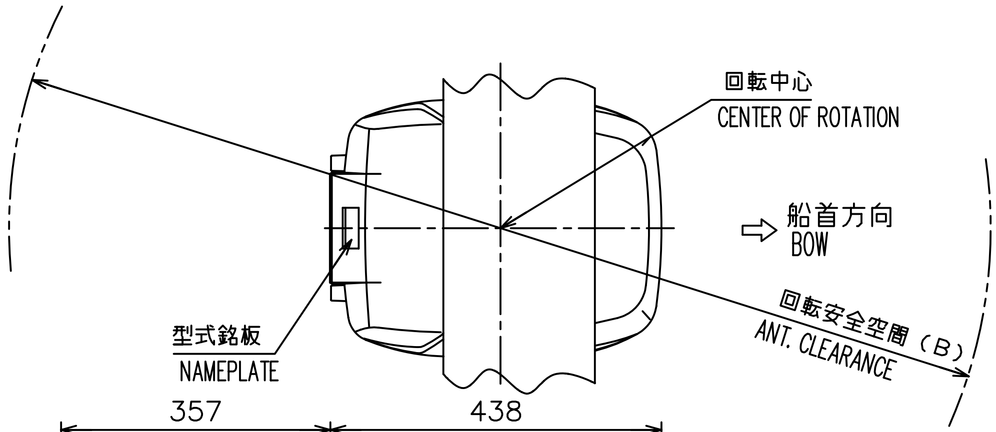
注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Feb. 3, '05	E. MIYOSHI	MODEL 1734C MODEL 1834C/1834C(-BB)	TITLE	RSB-0071
CHECKED	TAKAHASHI. T	MODEL 1833/1833C MODEL 1732/1732C	名称	空中線部
APPROVED	Y. Hatai	RS-1000 MODEL 1832		外寸図
SCALE 1/10	MASS 8 ±10% kg		NAME	ANTENNA UNIT
DWG.No.	C3441-G01- G	03-136-6001-G2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



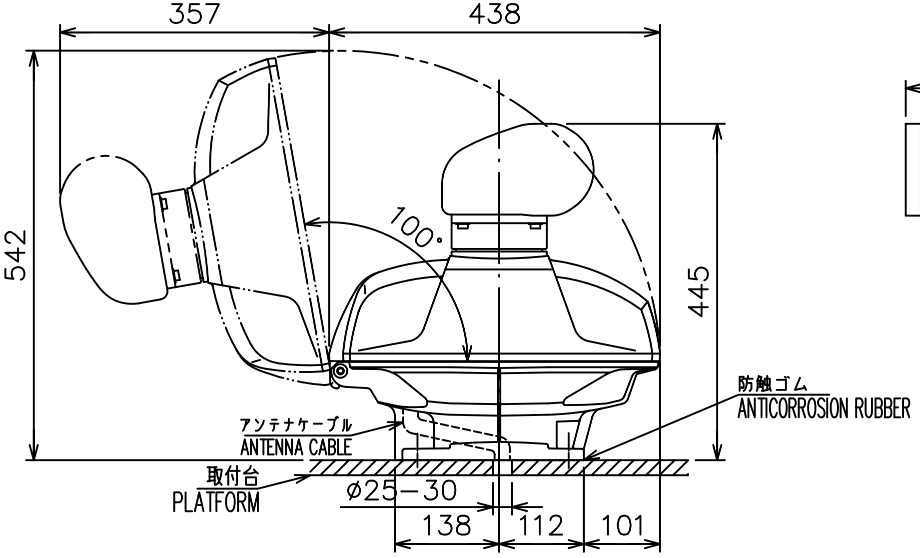
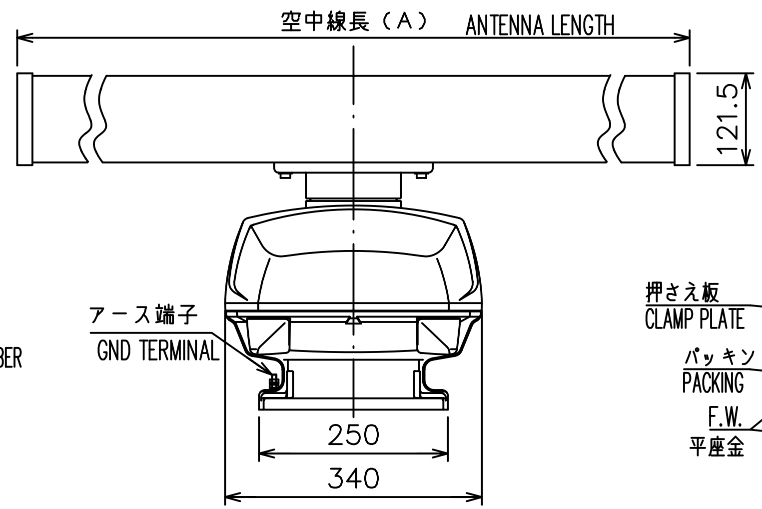


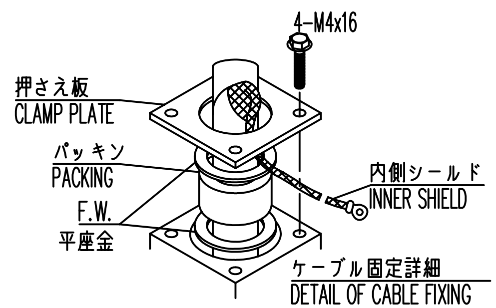
表２ TABLE 2

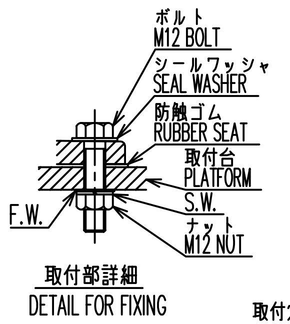
種類 TYPE	XN10A	XN12A	XN13A
空中線長（A） ANT. LENGTH (mm)	1036±10	1255±10	1795±10
回転安全空間（B） ANT. CLEARANCE (mm)	1200	1400	1940
質量（kg） MASS	22	25	27

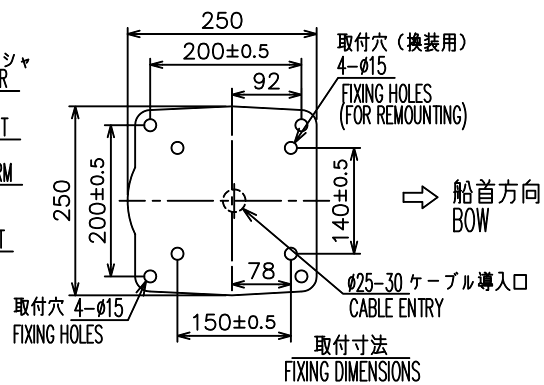
表１ TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4
1000<L≦2000	±5







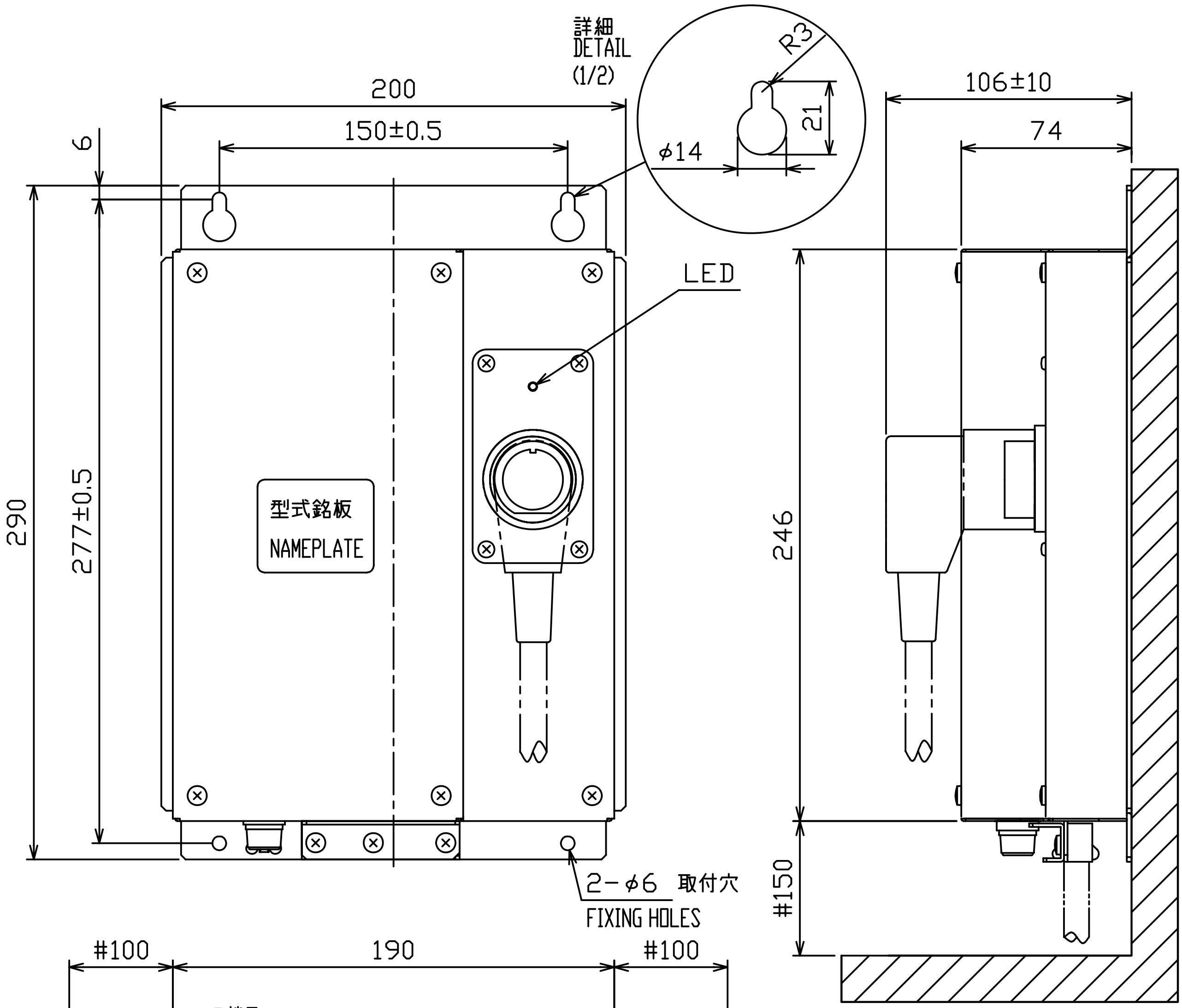


注記
1） 指定なき寸法公差は表１による。
2） 取付にはM12ボルトを使用のこと。
3） 空中線部の取付台にø25−30のケーブル導入口を開ける。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M12 BOLTS FOR FIXING THE UNIT.
3. MAKE A CABLE ENTRY HOLE ø25−30 ON PLATFORM.

DRAWN	1/Jul/09 T.YAMASAKI		TITLE RSB−0070/0072/0073
CHECKED	1/Jul/09 T.TAKENO	OTHERS	名称 空中線部
APPROVED	8/Jul/09 R. Esumi	MODEL1942M2,MODEL1954Cser. FR−7062ser, FR−8062ser.	外寸図
SCALE	1/10 MASS 表２参照 SEE TABLE 2		NAME ANTENNA UNIT
DWG.No.	C3539−G03− B	REF.No. 03−142−300G−5	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



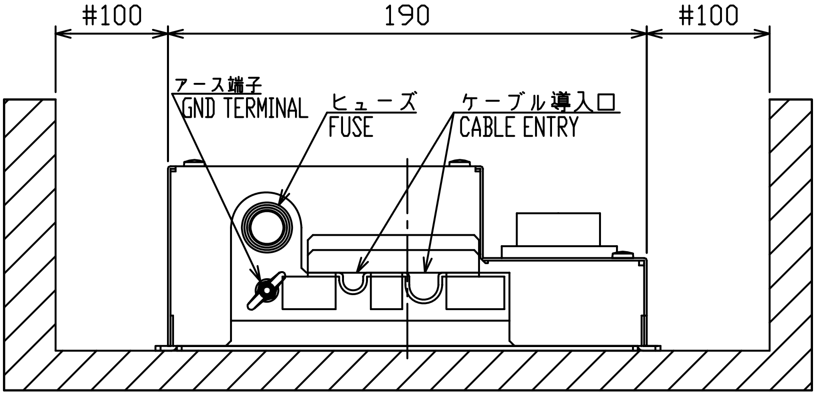


表1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注　記　1）＃印寸法は最小サービス空間寸法とする。
　　　　2）指定外の寸法公差は表１による。
　　　　3）取付用ネジは＋トラスタッピンネジ呼び径４×１６を使用のこと。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 4x16 FOR FIXING THE UNIT.

DRAWN Dec. 8, '02	E. MIYOSHI		TITLE PSU-005
CHECKED	TAKAHASHI.T	MODEL 1954C-BB	名称 電源部
APPROVED	Y. Hatai	MODEL 1954C MODEL 1953C	外寸図
SCALE 1/3	MASS 1.9 kg ±10%		NAME POWER SUPPLY UNIT
DWG.No.	C3512-G01- B	19-022-200G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

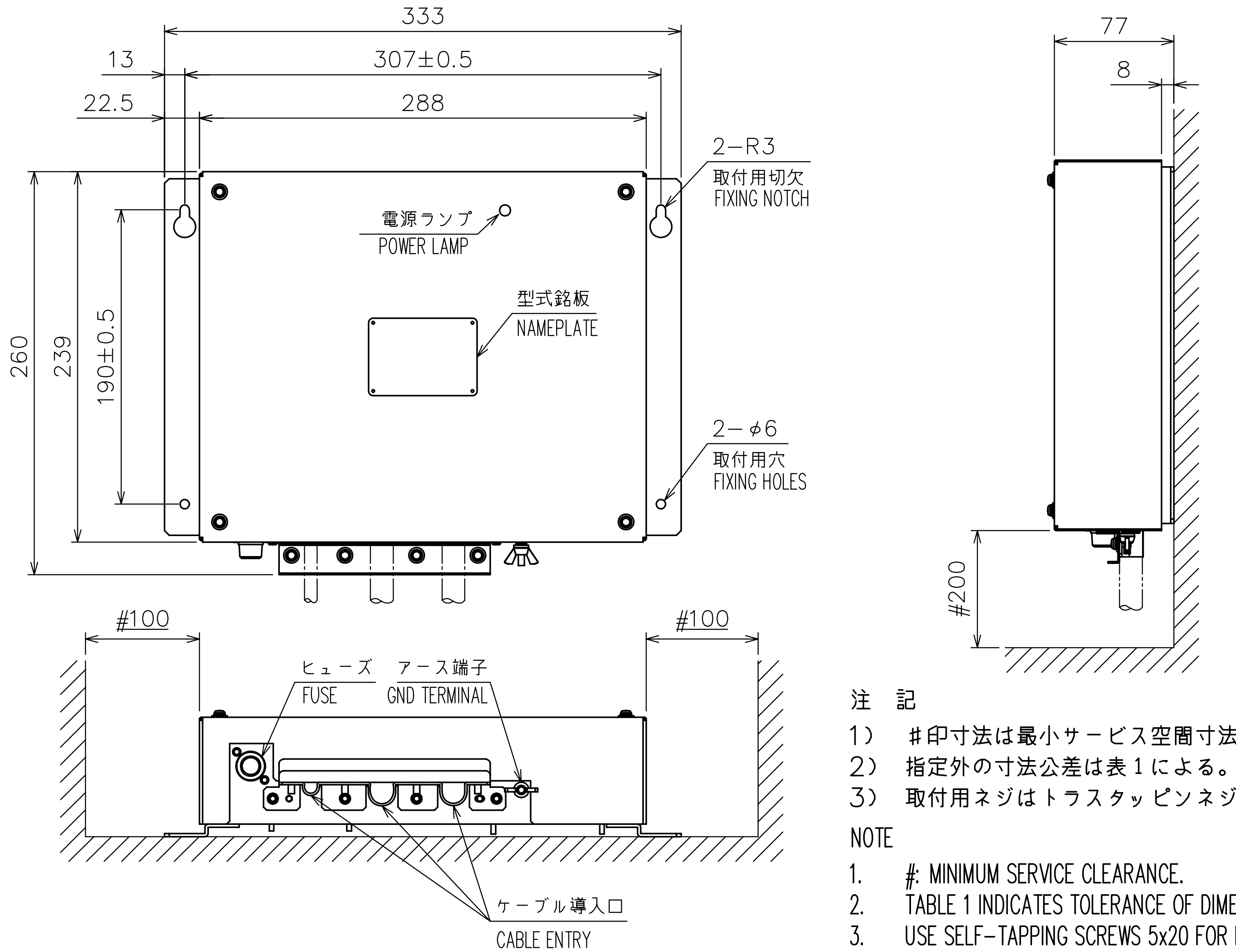


表 1　TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

注　記

1）　＃印寸法は最小サービス空間寸法とする。
2）　指定外の寸法公差は表１による。
3）　取付用ネジはトラスタッピンネジ呼び径5×20を使用のこと。

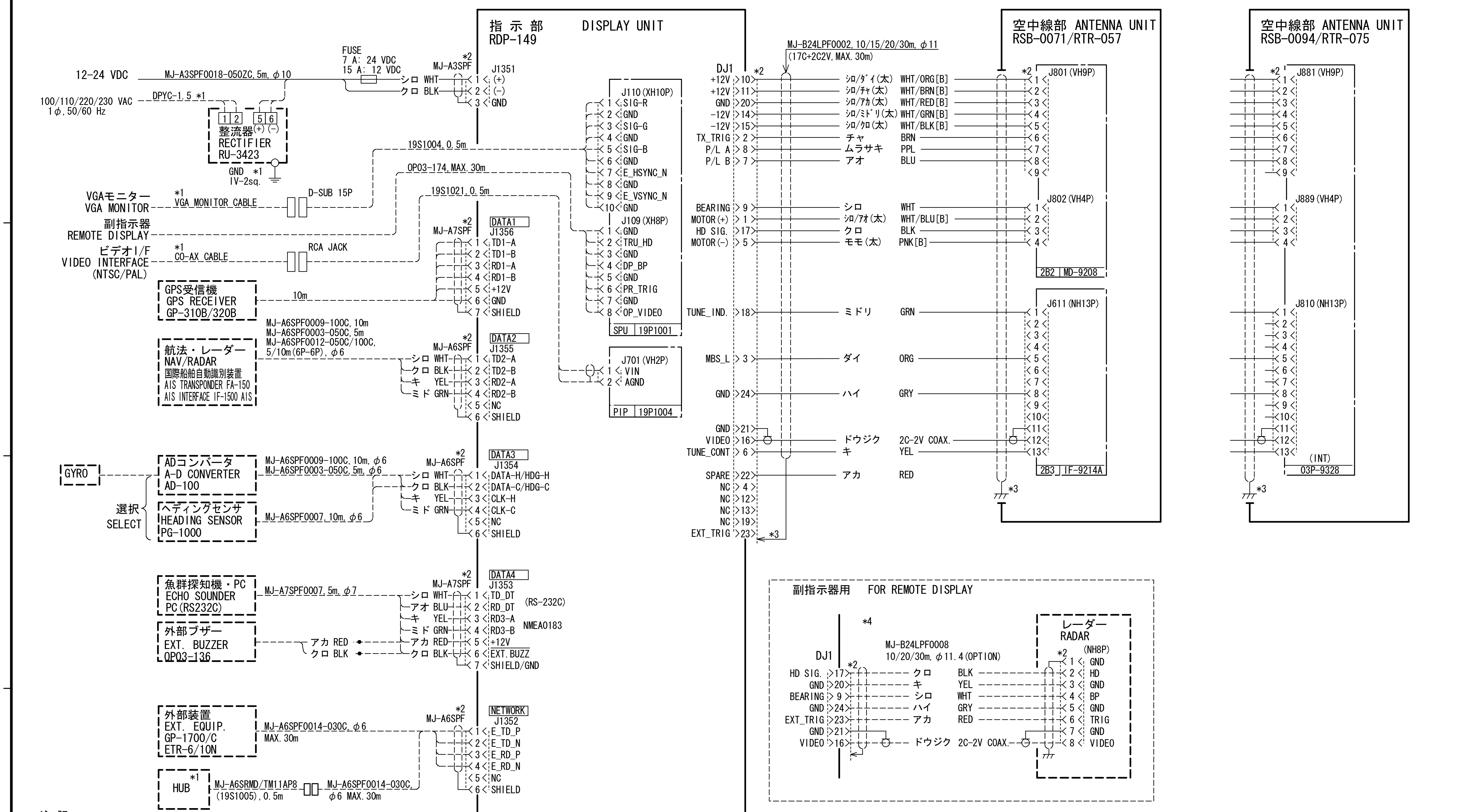
NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN Apr. 8, '05 E. MIYOSHI		TITLE	PSU-008
CHECKED TAKAHASHI. T		名称	空中線電源部
APPROVED Y. Hatai	MODEL 1964C		外寸図
SCALE 1/4	MASS 2.7 ±10% kg	NAME	POWER SUPPLY UNIT
DWG.No. C3548-G01- A	19-025-400G-0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

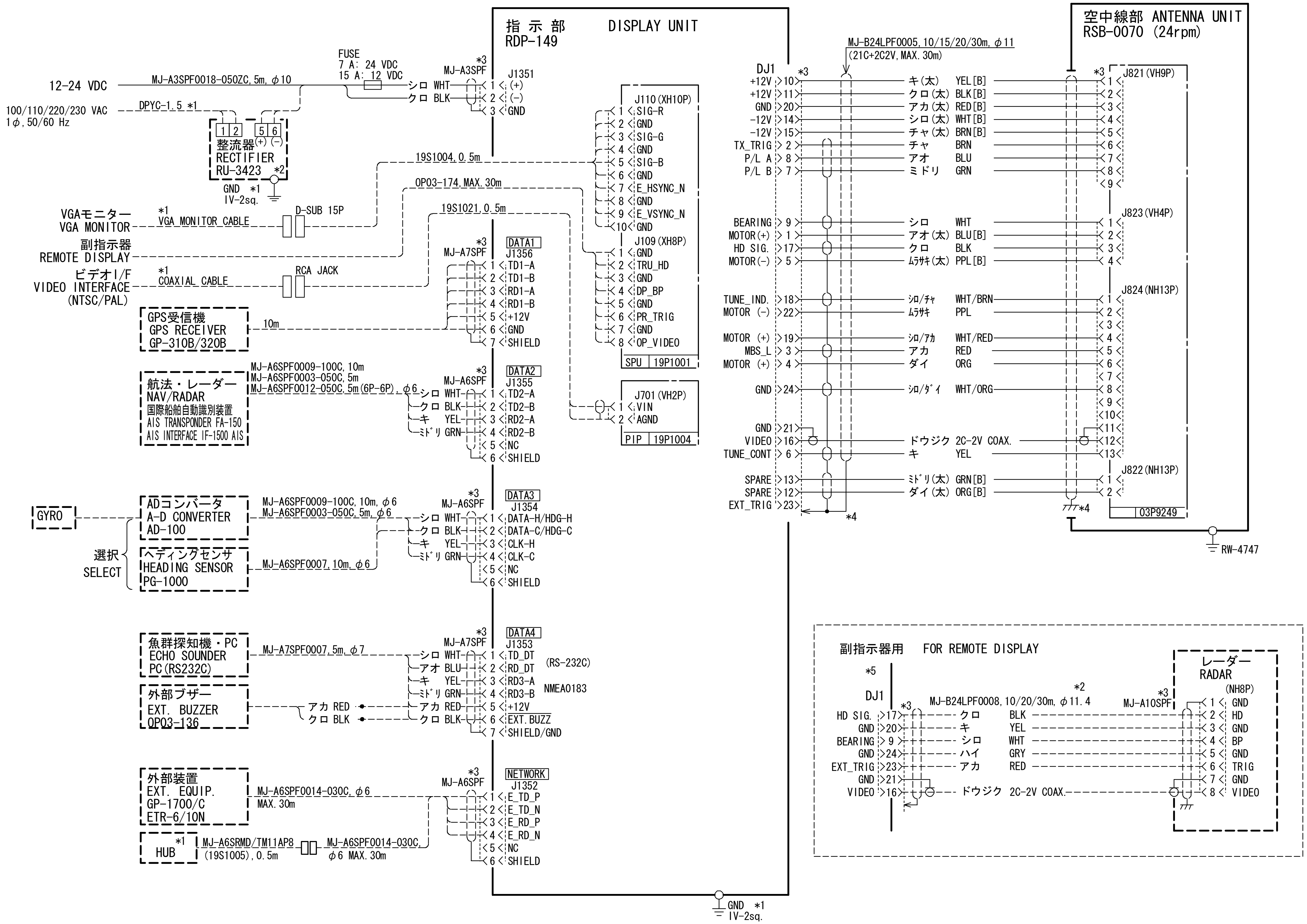


注 記
*1) 造船所手配
*2) コネクタは工場にて取付済み。
*3) シールドは両ユニット側で完全に接地すること。
*4) 副指示器として使用する場合は、指示部の内部設定を変更する。

NOTE
*1. SHIPYARD SUPPLY
*2. CONNECTOR PLUG FITTED AT FACTORY.
*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.

DRAWN	Jan. 27,'06 E.MIYOSHI	TYPE	MODEL 1824C/1834C
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No.	C3543-C01- F		INTERCONNECTION DIAGRAM

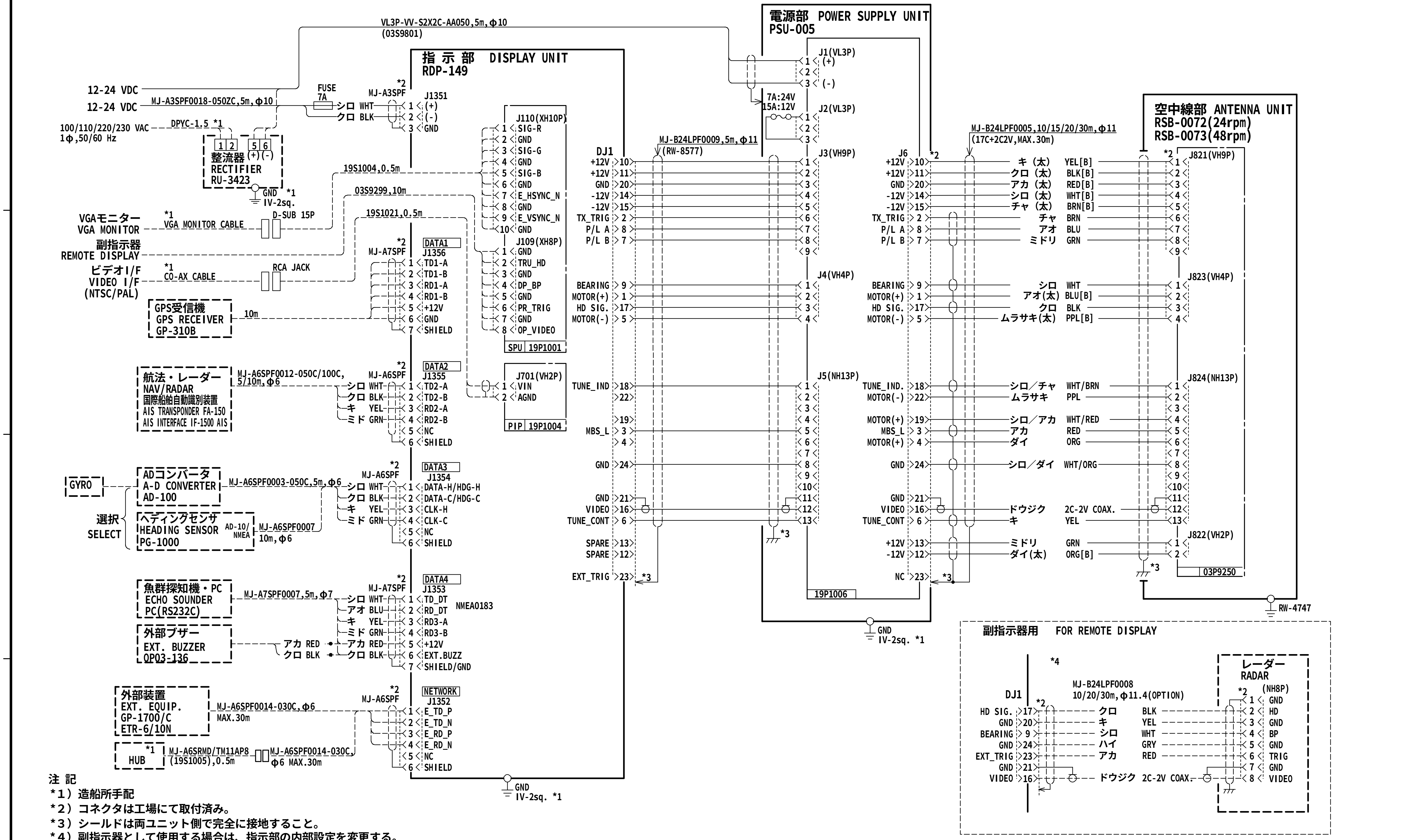
FURUNO ELECTRIC CO., LTD.



注 記
*1）造船所手配
*2）オプション
*3）コネクタは工場にて取付済み。
*4）シールドは両ユニット側で完全に接地すること。
*5）副指示器として使用する場合は、指示部の内部設定を変更する。

NOTE
*1. SHIPYARD SUPPLY
*2. OPTION
*3. CONNECTOR PLUG FITTED AT FACTORY.
*4. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*5. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.

DRAWN	Jan. 27,'06 E.MIYOSHI	TYPE	MODEL 1934C/1944C
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No.	C3545-C01- F		INTERCONNECTION DIAGRAM



注 記

*1）造船所手配

*2）コネクタは工場にて取付済み。

*3）シールドは両ユニット側で完全に接地すること。

*4）副指示器として使用する場合は、指示部の内部設定を変更する。

NOTE

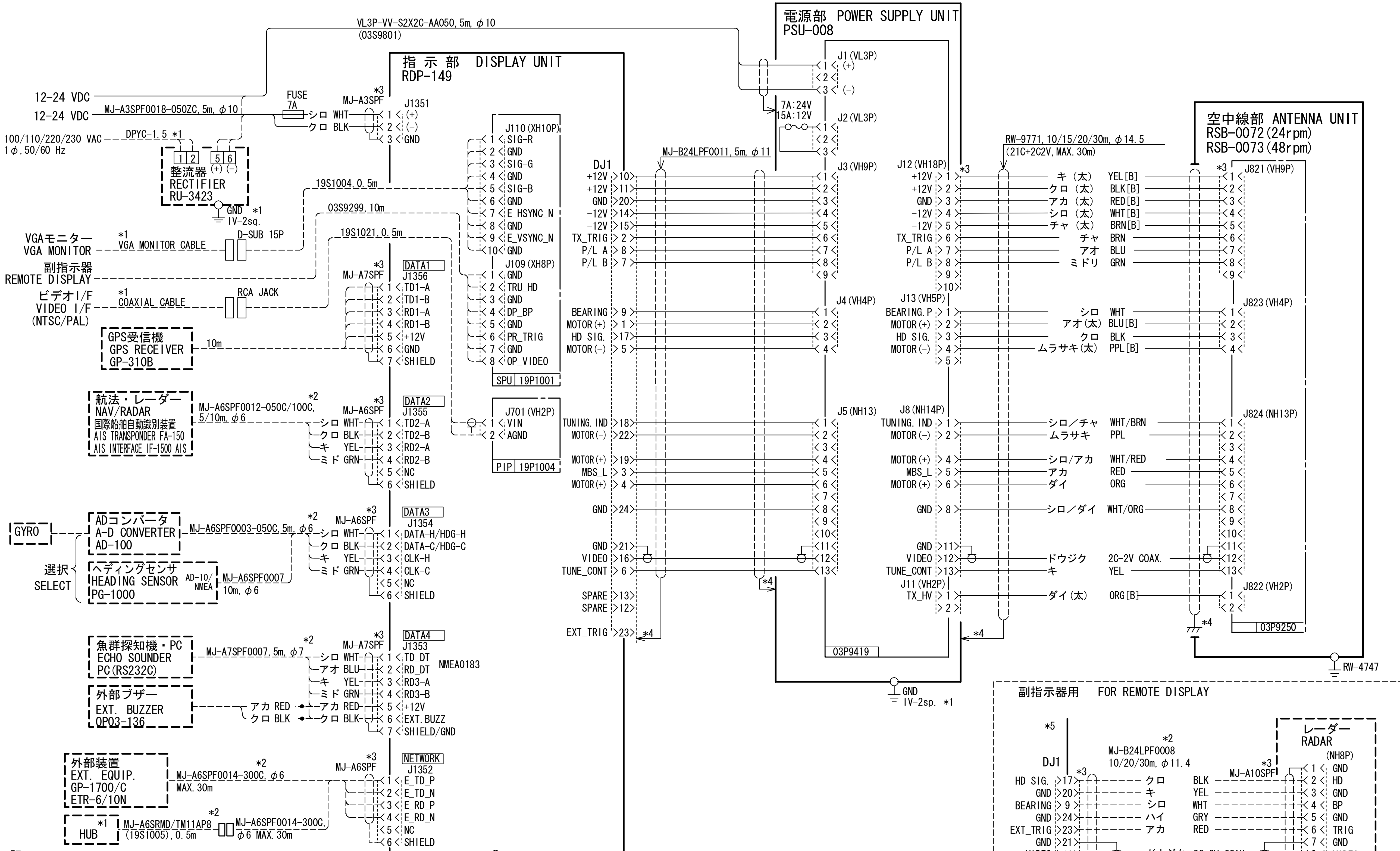
*1. SHIPYARD SUPPLY.

*2. CONNECTOR PLUG FITTED AT FACTORY.

*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.

*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.

DRAWN Nov 9,'05	E.MIYOSHI	TYPE	MODEL 1954C
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー 相互結線図
APPROVED	Y. Hatai		
SCALE	MASS kg	NAME	MARINE RADAR INTERCONNECTION DIAGRAM
DWG.No. C3547-C01- D	19-025-5053-2		

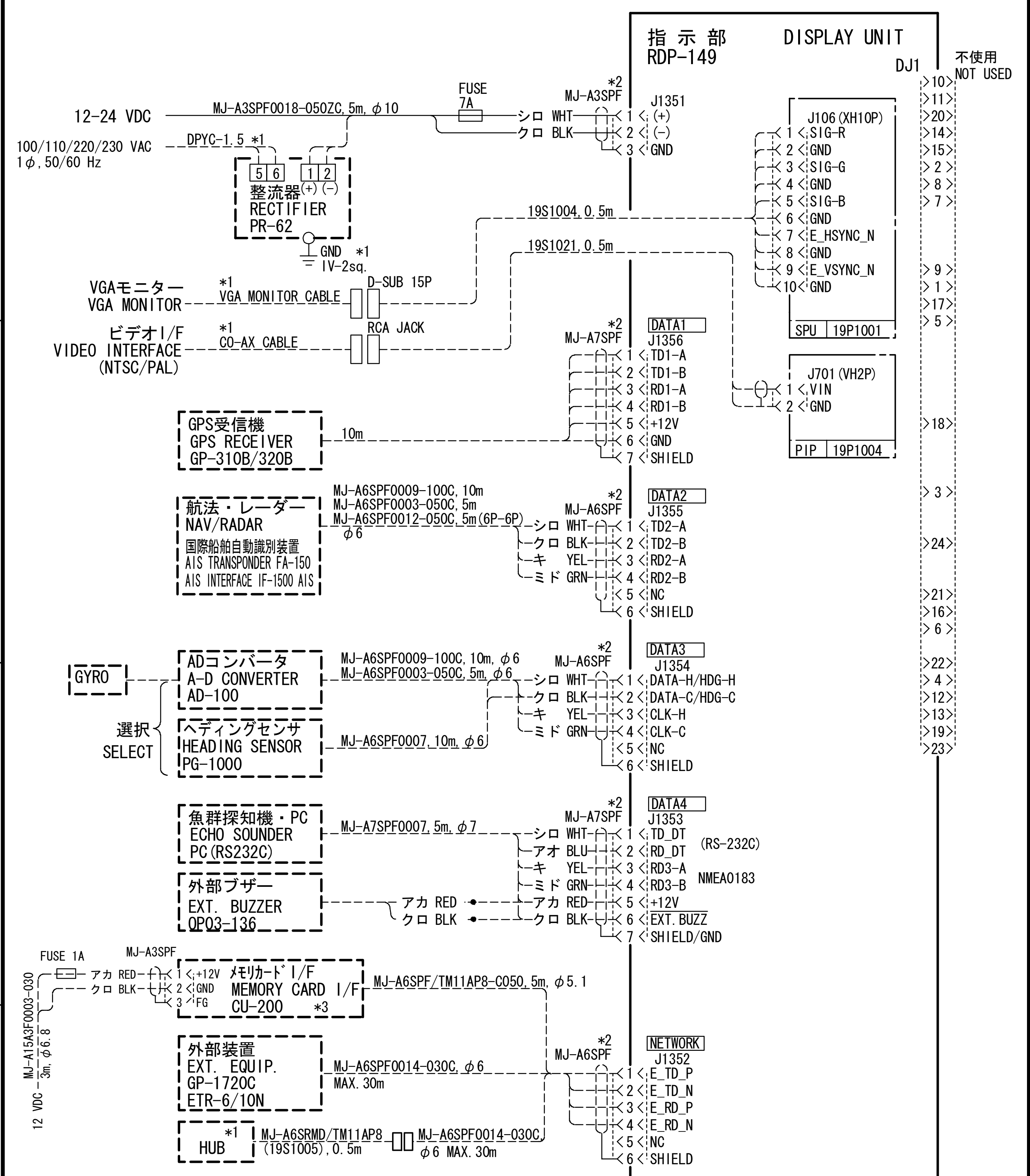


注 記
*1）造船所手配。
*2）オプション。
*3）コネクタは工場にて取付済み。
*4）シールドは両ユニット側で完全に接地すること。
*5）副指示器として使用する場合は、指示部の内部設定を変更する。

NOTE
*1. SHIPYARD SUPPLY.
*2. OPTION.
*3. CONNECTOR PLUG FITTED AT FACTORY.
*4. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*5. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.

DRAWN Jan.26,'06	E.MIYOSHI	TYPE	MODEL 1964C
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No. C3548-C01- E	REF.No. 19-025-5054-1		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.



注 記
＊1）造船所手配
＊2）コネクタは工場にて取付済み。

NOTE
*1. SHIPYARD SUPPLY
*2. CONNECTOR PLUG FITTED AT FACTORY.

DRAWN Jan.27.'06 E.MIYOSHI		TITLE	GD-1920C
CHECKED TAKAHASHI.T		名称	カラービデオプロッタ
APPROVED Y. Hatai			相互結線図
SCALE	MASS ±10% kg	NAME	COLOR VIDEO PLOTTER
DWG.No. C4432-C01- F			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.